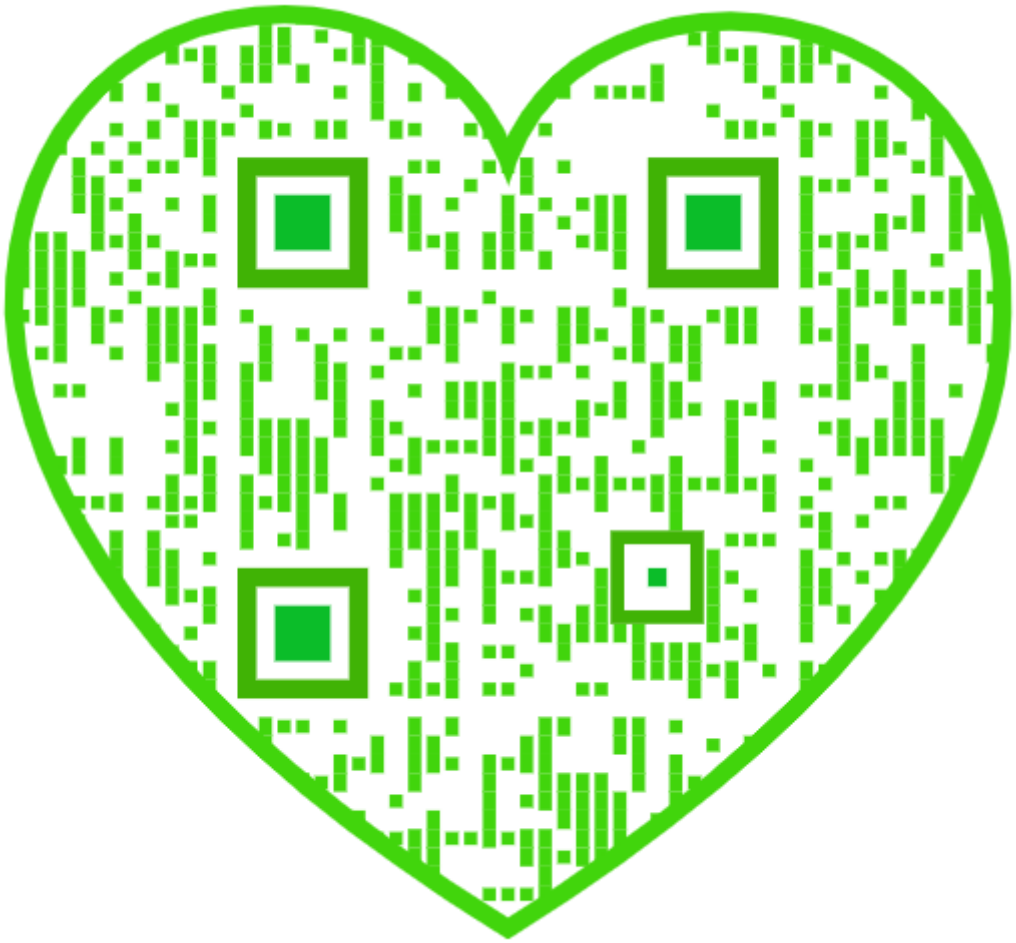


NEW

ELEMENTARY ARITHMETIC

BY

GEORGE WENTWORTH

AUTHOR OF TEXT-BOOKS IN MATHEMATICS

GINN & COMPANY

BOSTON · NEW YORK · CHICAGO · LONDON

Acc't 119.07.855

HARVARD COLLEGE
MAR 14 1918
LIBRARY

Harvard University,
Dept. of Education Library,
Gift of the Publishers.

COPYRIGHT, 1907
BY GEORGE WENTWORTH

ALL RIGHTS RESERVED

77.4

The Athenæum Press
GINN & COMPANY · PROPRIETORS · BOSTON · U.S.A.

PREFACE

Whatever may be his future course in life, every child should have a thorough knowledge of the fundamental processes of arithmetic. No one subject serves so well to develop in the young accuracy, speed, and logical habits of mind as does the early training in arithmetic.

This text-book is new and is intended for pupils in the second, third, and fourth grades. It contains five chapters, each of which should constitute the work for half a year. The first chapter may be used in the last half of the second year, and scholars should master the whole book by the end of the fourth year.

Each subject is developed by forcing the scholars to approach it logically by means of a series of questions, the answers of which are easy to discover and probably are known already by the pupils. The utmost pains has been taken to put in the text no words or phrases that might seem hard or confusing to the pupils.

The shortest and best method of learning arithmetic is by solving problems. This book contains a great number of examples and problems, which have been selected and graded with care.

For the study of arithmetic in higher grades it is absolutely necessary that each pupil should have at his tongue's end the different combinations in addition and in multiplication. Subtraction is taught easily as the reverse of addition, and division as the reverse of multiplication. The greatest stress is laid upon repetition in interesting variations until each young scholar is able to give in an instant the correct answer to any simple question in

addition, subtraction, multiplication, and division. These processes have been made as easy as is consistent with good teaching, and have been presented in a manner most attractive to the beginner. At the same time he is taught to *know* his combinations and never to use the awkward and inaccurate method of counting in place of adding or multiplying.

Easy fractions and the more common measures are introduced early and will be found of use in stimulating the interest of the pupils in their work. Common fractions have been treated in a manner that compels the beginners to understand them thoroughly and at the same time to do some logical thinking.

A very short treatise has been presented on each of the following subjects: denominate numbers, decimal fractions, and bills and receipts. On these subjects enough has been included in the book to assist greatly the work in the fifth and sixth grades.

The author is indebted to many eminent teachers for valuable suggestions and criticisms. He desires to acknowledge his special indebtedness to Mrs. Mary Ziek Andre of Cedar Rapids, Iowa, who has made suggestions and furnished material of great value.

Every effort has been made to avoid errors in text and in answers. The author will be very grateful to any one for corrections, criticisms, or suggestions.

GEORGE WENTWORTH

EXETER, NEW HAMPSHIRE

SUGGESTIONS TO THE TEACHER

This text-book is designed to be introduced not earlier than the last half of the second school year. Each chapter constitutes the work for a half year. In many schools it is deemed preferable not to introduce a text-book in arithmetic before the beginning of the third year; but much depends upon the character of the preliminary work. The child's early lessons in numbers must be related closely to his experience with *things*; hence *sense training* should serve as the foundation for a rational study of numbers.

Lack of power to image is the source of much of the weakness and inaccuracy in arithmetic. Systematic training in observation and in visualization is necessary to the development of the imaging power. It will be observed that in this book much use has been made of visualization as a means of fixing the number facts of the fundamental operations.

The purpose of the exercises that should characterize the period preceding the introduction of the text-book is not to teach color or form or sound, but to develop in the pupil the *power of attention* through the systematic training of his senses.

The following exercises will serve as a suggestive guide for this preliminary work.

Eye training. 1. Require four or five children to stand in a row before the class. The pupils in their seats notice the position of the pupils in front. The children in their seats bow their heads, and the teacher changes the order of the scholars in front. Teacher gives command, "Heads up!" Now ask who can arrange the pupils in front in the order they were at first.

2. All the children bow their heads. The teacher touches four or five pupils and they run into the hall. Teachers orders heads up. The children in the hall run through the room. Now ask who can call them by name in the order in which they ran through the room.

3. Show four objects, each of a different color. The children observe them, and the teacher covers the objects. The children name the objects in the order shown; then name the colors in the order the objects were shown.

4. Show the same objects. The pupils observe them and then bow their heads. The teacher changes the order of the objects and requires the pupils to restore them to their original position.

Ear training. 1. A pupil stands in front with his back to the class. Let him name the pupils by their voices when they ask in turn, "Who am I?"

2. A pupil is blindfolded, and pupils from different directions ask, "Where am I?" and the one blindfolded tells the direction of each speaker or points towards him.

3. The pupils bow their heads, and the teacher drops on the floor at different distances some heavy object. The pupils try to determine the distances by the sound.

4. The pupils bow their heads, and the teacher strikes different objects. The pupils try to name the objects in the order in which they are struck.

Touch training. The teacher should possess a small supply of spheres, cubes, prisms, cylinders, etc.

1. A scholar is sent to find a sphere, and then to find a larger sphere. Another pupil is directed to find a smaller sphere, and then to find other spheres.

2. A pupil places his hands behind him, and the teacher puts a prism into his hands. The pupil tells its form and dimensions. The pupil distinguishes various objects by touch.

3. Place in a row a cube, a sphere, and a cylinder.

The children point to the sphere; to the cube; to the cylinder.

The children tell which solid is at the right; which solid is at the left; which solid is in the middle. Pictures of the solids may be used in place of the solids.

The pupils close their eyes and picture these solids in their minds; then name them from right to left and from left to right.

The scholars may be asked questions similar to the following.

What have you ever seen that looks like a sphere?

Name the largest sphere you have ever seen. Name the smallest.

Name some things that look like a cylinder.

How many faces of the cube can you see in this picture of a cube? How many faces has a cube? How many corners? How many edges? Name something that looks like a cube.

How many sides has a square? Are all its sides of the same length? Measure them to see. Draw a square.

Using a string or a pattern, let the pupil draw a circle on the blackboard. In what way is a circle different from a sphere?

How many sides has an oblong or rectangle? Are the sides equal in length? In what way is an oblong different from a square? Draw an oblong.

How many sides has a triangle? Draw a triangle. Name some triangles you have seen.

Through the medium of games and exercises the children should become familiar with the meaning of the following terms: sphere, cylinder, prism, cube, square, oblong, circle, triangle.

They should become familiar with the terms of comparison: larger, largest; smaller, smallest; longer, longest; heavier, heaviest; higher, highest; wider, widest; etc.

They should become accustomed to the terms of position and direction: back, front; right, left, middle; north, south, east, west.

They should become accustomed to the terms of color: red, orange, yellow, green, blue, purple, white, black.

Much of this knowledge is in the possession of each child before he enters the school. The *acquirement* is not the end of these exercises. The purpose of these exercises is not for the child to *acquire* facts, but to *utilize* facts as a means of developing his powers to see, to image, and to form *proper judgments.*

In addition to the great number of problems given in this book, suggestions are made at various points of the text to serve as an aid to the teacher in preparing without trouble numerous other examples and problems. These additional examples should be given to the class whenever more drill on any subject may be required, or whenever such exercises will stimulate the interest of the pupils.

Scholars in these lower grades require frequent review of the subjects they have learned, and the teacher should make it a point to review again and again the more important topics.

CONTENTS

CHAPTER I

PAGE

READING AND WRITING NUMBERS 1
ADDITION 8
SUBTRACTION 18
MEASURING 25
PARTS OF OBJECTS 29
COUNTING 35

CHAPTER II

READING AND WRITING NUMBERS 49
ROMAN NUMERALS 51
ADDITION 53
SUBTRACTION 59
MEASURING 66
PERIMETER AND AREA 69
PARTS OF OBJECTS 72
MULTIPLICATION AND DIVISION 76
REVIEW EXERCISES 82

CHAPTER III

READING AND WRITING NUMBERS 93
ROMAN NUMERALS 95
ADDITION 96
SUBTRACTION 100
MULTIPLICATION AND DIVISION 103
FRACTIONS 123
MEASURES 127
REVIEW EXERCISES 133

CHAPTER IV

PAGE

NOTATION AND NUMERATION 141
ADDITION 143
SUBTRACTION 146
MULTIPLICATION 148
DIVISION 153
LONG DIVISION 154
FRACTIONS 161
MEASURES 170
REVIEW EXERCISES 176

CHAPTER V

NOTATION AND NUMERATION 181
ADDITION 183
SUBTRACTION 188
MULTIPLICATION 190
DIVISION 192
MEASURES 195
FRACTIONS 204
DECIMAL FRACTIONS 219
BILLS AND RECEIPTS 225
REVIEW EXERCISES 228

NEW ELEMENTARY ARITHMETIC

CHAPTER I

READING AND WRITING NUMBERS

NUMBERS TO 10

ORAL EXERCISES

1. How many eyes have you? How many ears? How many hands? How many feet?

2. Show me 2 pencils. Show me 2 pieces of chalk.

3. Close your eyes and pick out 2 marbles; 2 peas; 2 sticks.

4. Take 1 marble in the right hand. How many marbles do you have to put with this marble to make 2 marbles?

5. Take one pea in the left hand. How many peas must you have in the right hand to make two peas?

6. How many, then, do one and one always make?

7. When you have 2 marbles in one hand and put one of them into the other hand, how many marbles have you in each hand?

8. If you have 2 cents and pay 1 cent for a stick of candy, how many cents will you have left?

9. So when you take one away from two, you will always have how many left?

10. Two little girls may hold up their hands. How many hands do we see?

11. How many feet have these two girls?

12. How many eyes have these two girls?

13. Hold 2 beans in your right hand and 2 beans in your left hand. How many beans have you?

14. Take 2 blocks in each hand. How many blocks have you?

15. Close your eyes and take 4 pegs in your hand.

16. Tell me the names of 4 girls in your class. Tell me the names of 4 boys.

17. 2 and what number make 4? When you take 2 from 4 how many have you left?

18. Hold four peas in your right hand. Put one of these peas into your left hand. How many peas have you in your right hand now?

19. There were 3 birds in a tree and 1 bird flew away. How many birds were left in the tree?

20. Jennie has 4 dolls; 3 of them are on the floor and the rest are in bed. How many dolls are in bed?

21. Read rapidly:

1 and 1 make what number?
1 from 2 is what number?
2 from 4 is what number?
1 from 3 is what number?
2 and 2 make what number?
2 and 1 make what number?
1 from 4 is what number?
3 and 1 make what number?

22. How many horses make a pair? How many horses are there in three pairs?

23. If 2 of the horses in this team are black, and the rest are gray, how many gray horses are there?

24. You may ask three girls in your class to stand. How many hands have these three girls?

25. Name 3 boys. How many feet have they?

26. How many children have you named in all?

27. If one boy stands with the three girls, how many more boys must you have to make six children?

28. A five-cent piece and a one-cent piece make how many cents? How many 2-cent stamps can you buy with this money?

29. What will 2 oranges cost at 3 cents an orange?

30. Name the things you would like to buy with six cents, paying one cent or two cents for each thing.

31. If you have 6 cents and buy a flag for 1 cent, how many cents will you have left?

32. Read rapidly:

4 and what number make 6?
5 and what number make 6?
3 and what number make 6?
5 from 6 is what number?
2 from 6 is what number?
3 from 6 is what number?
1 from 6 is what number?
1 and what number make 6?
2 and what number make 6?
4 from 6 is what number?

ORAL EXERCISES

1. What is the cost of 4 two-cent postage stamps? With what pieces of money could you exactly pay for these stamps?

2. If you have 8 pennies and divide them equally between 2 boys, how many cents will each boy have?

3. At 2 cents each, how many hat pins can you buy for 8 cents?

4. If 8 boys are coasting and their sled will hold only 6 boys, how many boys must wait each time?

5. If John has 8 apples, and gives his brother and his sister 2 apples each, how many apples will he have left?

6. What does one from eight leave?

7. How many must you put with six to make seven?

8. If a boy has eight cents and spends five cents for peanuts, how many cents will he have left?

9. A bird's nest often has three eggs in it. How many eggs are there in two such nests? How many eggs in three such nests?

10. How many blocks are there in 3 rows of blocks with 3 blocks in each row?

11. A triangle has three sides. Can you draw a triangle? How many sides have three triangles? If we rub out two of the sides of one triangle, how many lines have we left in the three triangles?

12. How many lines are six lines and three lines?

13. If Frank is 5 years old and his sister is 4 years older, how old is his sister?

14. How many apples are 5 apples and 4 apples?

ORAL EXERCISES

1. If Mary has 9 apples and gives Helen 4 apples, how many apples will Mary have left?

2. If Susan has 9 apples and gives away 5 apples, how many apples will she have left?

3. Lucy had 3 cents and her mother gave her 6 cents more. How many cents did she then have?

4. When Tom started for school he had 9 marbles. On the way he lost 3 of them. How many marbles did he have left?

5. If you have 9 cents and buy a pound of sugar for 7 cents, how many cents will you have left?

6. If a man has 2 dollars, how many dollars must he earn before he can buy a coat for 9 dollars?

7. How many cents are 2 five-cent pieces?

8. A hen has 5 black chickens and 5 white ones. How many chickens has she in all?

9. If one black chicken should run over to play with the white ones, how many black chickens would be left? How many chickens would there be on the other side?

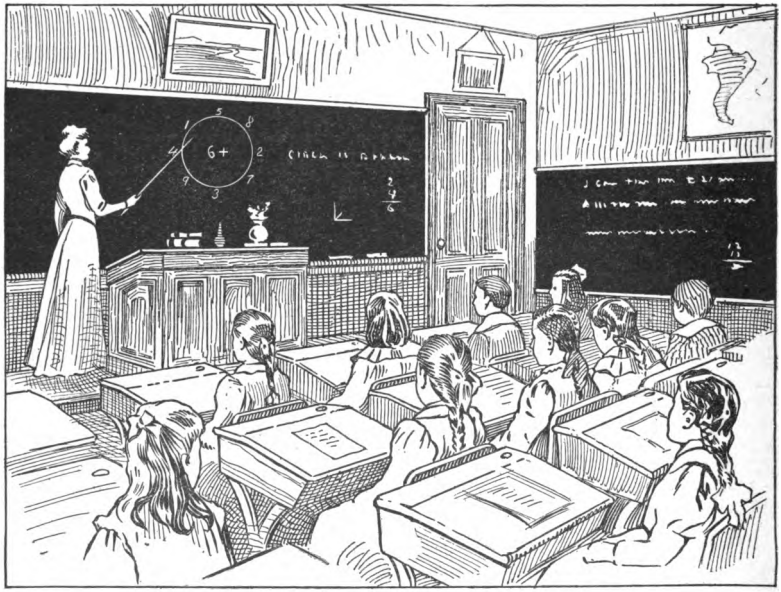
10. Let us think of all the ways in which these little chicks may play in two parties.

NOTE. Illustrate with colored crayons by using spots or crosses for chickens.

11. If a cat should catch two of these chickens, how many would be left?

12. If four of the little chickens have run into the next yard, how many are left with the mother hen?

13. Here is a picture of the front part of a schoolroom. You can see 4 children in the first row and 5 children in the second row. How many children are there in the first two rows?



14. You can see in the picture 2 boys and 8 girls. How many children can you see in all?

15. 2 children and 8 children are how many children?

16. When we count we use **numbers.**

We will write the first ten numbers in two ways. In the first line we use *words*. In the second line we use *figures*.

One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten
1	2	3	4	5	6	7	8	9	10

NUMBERS TO 100

ORAL EXERCISES

1. Count from ten to twenty. Eleven is written 11; twelve, 12; thirteen, 13; fourteen, 14. Write in figures fifteen, sixteen, seventeen, eighteen, nineteen.

2. Count from twenty to fifty. Twenty is written 20. Twenty means two tens and no ones. Thirty means three tens and no ones. Thirty is written 30.

3. Write in figures forty, fifty, sixty, seventy, eighty, ninety.

4. Thirty-two is written 32. It means 3 tens and 2 ones.

5. Read these numbers and tell what each means:

28	36	45	67	88
47	19	50	92	99
39	43	78	56	63
72	51	83	44	75

WRITTEN EXERCISES

1. Write in figures and tell what each figure means, thus: thirty-seven, written 37, means 3 tens and 7 ones:

Forty-two	Fifty-one
Eighteen	Thirty-seven
Fifty-five	Twenty-eight
Sixty-eight	Forty-nine
Seventy-nine	Sixty-nine
Eighty-three	Seventy-eight
Ninety-six	Ninety-three

2. In numbering the chapters or lessons in a book, letters called **Roman numerals** are used. The numbers from 1 to 12 are written in this way:

I = 1	IV = 4	VII = 7	X = 10
II = 2	V = 5	VIII = 8	XI = 11
III = 3	VI = 6	IX = 9	XII = 12

ADDITION

ORAL EXERCISES

1. How many marks are / / and / / /?
2. How many bottles are and ?
3. How many blocks are and ?
4. How many mugs are and ?
5. How many dolls are five dolls and three dolls?
6. How many birds are seven birds and two birds?
7. How many are six and four?
8. How many are seven and three?
9. In answering each question you combined two numbers into one number. We call this **adding** the numbers. The process of *adding numbers* is called **addition**. The **sum** is *the number obtained by adding* two or more numbers.

ORAL EXERCISES

1. When numbers are to be added they are usually written this way:

$$\begin{array}{r} 3 \\ 2 \\ \hline 5 \end{array}$$

The sum is written below the line in this way:

2. Numbers to be added may be written thus: $3 + 5 = 8$. We may read this 3 *plus* 5 *equal* 8; or, 3 *and* 5 *are* 8.

3. Read the addition in this table both ways, thus: 1 plus 1 equal 2; 1 and 1 are 2.

1 + 1 = 2	1 + 6 = 7	3 + 6 = 9
1 + 2 = 3	2 + 5 = 7	4 + 5 = 9
2 + 1 = 3	3 + 4 = 7	5 + 4 = 9
1 + 3 = 4	4 + 3 = 7	6 + 3 = 9
2 + 2 = 4	5 + 2 = 7	7 + 2 = 9
3 + 1 = 4	6 + 1 = 7	8 + 1 = 9
1 + 4 = 5	1 + 7 = 8	1 + 9 = 10
2 + 3 = 5	2 + 6 = 8	2 + 8 = 10
3 + 2 = 5	3 + 5 = 8	3 + 7 = 10
4 + 1 = 5	4 + 4 = 8	4 + 6 = 10
1 + 5 = 6	5 + 3 = 8	5 + 5 = 10
2 + 4 = 6	6 + 2 = 8	6 + 4 = 10
3 + 3 = 6	7 + 1 = 8	7 + 3 = 10
4 + 2 = 6	1 + 8 = 9	8 + 2 = 10
5 + 1 = 6	2 + 7 = 9	9 + 1 = 10

NOTE. By covering up the sums in the above table it may be used for drill work in the combinations through 10.

ORAL EXERCISES

1. How many eggs are 3 eggs and 4 eggs?
2. How many papers are 5 papers and 3 papers?
3. How many kittens are 7 kittens and 2 kittens?
4. Charles wrote 6 letters on Monday and 2 letters on Tuesday. How many letters did he write in the two days?
5. Fred has 8 marbles in one pocket and 2 marbles in another pocket. How many marbles has he in the two pockets?

6. John has 4 blocks and Frank has 3 blocks. How many blocks have John and Frank together?

7. Mary drank 2 glasses of milk and Susan drank 3 glasses of milk. How many glasses of milk did the two girls together drink?

8. Dick spent 2 cents for candy and 5 cents for a soda. How many cents did he spend in all?

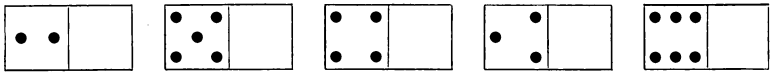
9. There are 7 sparrows on one tree and 2 sparrows on another tree. How many sparrows are there on the two trees?

10. It rained 4 days in May and 6 days in June. How many days did it rain in the two months?

11. Clara has 3 dolls and Mabel has 6 dolls. How many dolls have Clara and Mabel together?

WRITTEN EXERCISES

1. Copy these oblongs and add dots enough in each blank side to make 8 dots in the whole oblong.



2. Call these oblongs *cards*. Make cards so that the sum of the dots shall be 6; so that the sum shall be 7.

3. Make cards that will show these sums: $5+2$; $3+4$; $2+7$; $6+1$; $6+4$; $4+4$.

4. On these cards which you have made call the dots *cents* and make a problem for each card.

5. See if you can make five different cards, the sum of the dots on each card to be 10.

ORAL EXERCISES

1. See how quickly you can give these sums:

2	3	9	2	6	8	2	6	2	7
2	4	1	3	3	2	4	4	5	2
2	3	7	8	4	5	2	1	3	2
6	5	3	1	4	5	7	9	1	3
1	2	3	3	4	3	4	5	3	6
3	2	2	3	2	5	1	2	4	1
1	1	2	1	3	1	1	2	1	2
1	2	4	3	5	1	2	1	3	4
0	3	2	1	0	0	0	2	2	3
2	0	0	1	2	4	6	3	0	2
2	4	2	4	1	3	0	3	1	1

2. Read the following, thus: 6 and 5 are 11:

5	6	4	5	6	7	8	9
6	6	7	8	9	7	9	8
11	12	11	13	15	14	17	17
2	3	4	5	6	7	8	9
8	9	8	7	8	8	8	7
10	12	12	12	14	15	16	16
2	3	4	5	6	7	8	9
9	8	9	9	7	9	7	9
11	11	13	14	13	16	15	18

Cover the first line of sums and see if you can give them correctly. Do the same with the second line of sums, and the same with the third line of sums.

3. Practice on giving the following sums until you can give them instantly:

9	5	6	2	3	7	4	8	4	7
1	5	4	9	8	7	6	2	7	5
1	6	9	3	4	2	7	6	9	4
9	8	2	7	9	8	8	9	3	8
7	5	6	8	5	7	6	5	8	9
3	6	6	8	8	9	7	9	9	9

To THE TEACHER. Read the suggestions on drill work on p. 15.

ORAL EXERCISES

1. There are 4 panes of glass in one window and 4 panes of glass in another window. How many panes of glass are there in both windows?

2. Lucy has 8 cakes and Mary has 4 cakes. How many cakes have both?

3. There are 6 children in the first row of seats and 8 children in the second row. How many children are there in both rows?

4. In a schoolhouse there are 7 rooms upstairs and 6 rooms downstairs. How many rooms in the schoolhouse?

5. Henry saved 9 cents last week and 8 cents this week. How many cents did he save in the two weeks?

6. The gray hen has 9 chickens and the black hen has 6 chickens. How many chickens have the two hens?

7. The milkman brought us 8 quarts of milk one week and 5 quarts the next week. How many quarts did he bring in the two weeks?

WRITTEN EXERCISES

In adding numbers of two figures, write ones under ones and tens under tens.

Add each column separately, beginning with the ones.

Add 37 and 41.

37
41
78

The sum of the ones is 8. The sum of the tens is 7.

The sum of 37 and 41 is 78.

Add these numbers:

1.	2.	3.	4.	5.	6.	7.	8.
25	16	37	20	45	17	21	18
43	53	61	68	34	62	44	60

9.	10.	11.	12.	13.	14.	15.	16.
31	47	16	15	22	35	27	19
22	20	21	40	11	42	62	50
16	30	42	34	46	22	10	20

17.	18.	19.	20.	21.	22.	23.	24.
22	13	47	55	42	14	26	34
53	21	30	12	23	15	12	50
14	62	21	11	34	50	31	13

25.	26.	27.	28.	29.	30.	31.	32.
21	40	34	11	12	22	33	44
34	15	21	20	23	32	24	12
22	12	13	16	40	13	31	11
10	21	20	32	24	20	11	21

WRITTEN EXERCISES

Add the following columns both upward and downward. The sums should be the same whichever way you add. In this way you *check* or *prove* your work.

1.	2.	3.	4.	5.	6.	7.	8.
3	9	7	8	3	1	5	6
4	7	3	2	2	9	2	2
5	0	6	3	4	5	3	4
5	3	3	5	4	3	4	4

9.	10.	11.	12.	13.	14.	15.	16.
3	8	3	2	1	7	2	2
2	2	2	3	3	6	7	1
5	2	5	4	3	2	5	9
4	2	3	2	2	3	0	2
4	6	3	4	2	1	3	4

17.	18.	19.	20.	21.	22.
22	16	21	12	5	34
4	41	23	50	10	22
10	20	21	3	42	12
61	12	20	11	2	10
2	10	13	2	30	10

WRITTEN EXERCISES

1. There are 30 days in September and 31 days in October. How many days are there in the two months?

2. Charles read 23 pages in his book last week and 31 pages this week. How many pages did he read in the two weeks?

3. In a school there are 18 girls and 21 boys. How many pupils are there in the school?

4. John has 16 marbles and Henry has 22 marbles. How many marbles have both together?

5. Lucy counted on one bush 34 roses and on another 25 roses. How many roses did she count on the two bushes?

6. There are 46 books in one case and 23 books in another case. How many books are there in both cases?

7. There are 22 cars in one train and 26 cars in another train. How many cars are there in the two trains?

8. Frank and Helen were saving money for a Christmas present for their mother. Frank saved 21 cents and Helen saved 38 cents. How much did they together save?

9. John lives 12 miles north of town and James lives 16 miles south of town. How far apart do they live?

10. Mary's mother made 27 glasses of currant jelly and 32 glasses of grape jelly. How many glasses of jelly did she make?

DRILL WORK

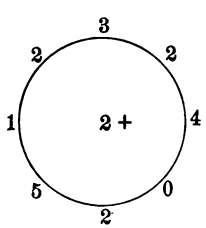
To THE TEACHER. It will be observed that nearly all of the work in addition has been arranged in column form. It should not be overlooked that the visualization of combinations as they appear in columns is much more valuable than the drill suggested by the devices given on pp. 16 and 17. Those devices may be used for variety but not at the expense of the drill in the forty-five combinations that appear in the table at the top of p. 16. This table of combinations should be kept in plain sight on the board or on a large card for the daily drill of each one of the scholars.

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	1
2	3	4	5	6	7	8	9	9
1	2	3	5	5	6	7	1	1
3	4	5	9	7	8	9	6	8
1	2	1	5	4	6	2	3	2
4	9	7	8	9	9	7	8	6
1	4	2	3	4	2	3	4	3
5	8	5	7	6	8	9	7	6

1. Copy these combinations on nine cards, each card containing five combinations. These may be distributed to the class, and the pupils tested on their ability to give correctly and quickly all the sums called for on the card. Other uses of these cards will suggest themselves.

2. *Counting exercises.* Let the scholars begin at 3 and add 2's until they reach 19; begin at 3 and add 4's until they reach 19; begin at 7 and add 3's until they reach 19. Continue with other numbers, the sums not to exceed 19.

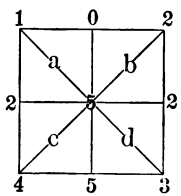
3. The following are some of the most common devices for blackboard drill work:



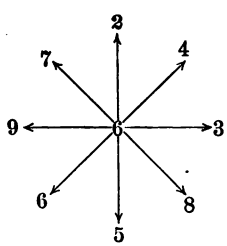
Draw a circle on the blackboard. Put one figure in the centre of the circle and other figures on the circumference. Be careful that the sum of the numbers to be added does not exceed the limits of the pupils' knowledge (at this stage through 19). Have the pupils add the number at the centre of the circle to each number on the circumference, as you point at these numbers, starting at different places. This exercise may be varied by asking the children to add

the numbers on the circumference, starting at different places and going in different directions.

Draw a square on the blackboard. Draw the diagonals and the other lines as indicated in the figure. Place numbers at each corner of the square, at the middle of each side, and at the centre of the square. In addition to exercises suggested by the circle, the pupils may give the sum of the three figures on each of the eight lines; and the sum of the four figures at the corners of each of the four small squares a, b, c, and d.



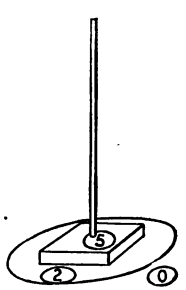
Draw on the board four double-headed arrows intersecting in a point as shown in the figure. Place one figure at the centre and one at the point of each arrow. The scholars should give the sum of the figure at the centre and the figure at the point of each arrow; and the sum of the three figures on each arrow. Change the order of the figures used.



Children's games. Write on the board scores for games, the sums to be given quickly. Have pupils make score cards for familiar games. To illustrate:

Fasten a rod to a block of wood and place the rod on the floor. Draw a circle around the block of wood.

The children toss rings at the rod. If a ring falls on the rod the score is 5; if it falls within the circle the score is 2; if it falls outside the circle the score is 0.

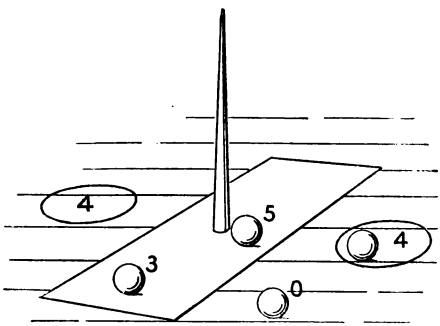


Mary tossed 3 rings on the rod, 3 within the circle, and 2 without the circle. What was her score?

John tossed 2 rings on the rod, 3 within the circle, and 3 outside the circle. What was his score?

Who won the game? Why?

Place an upright rod on the floor and draw an oblong and two circles. The children roll a ball. If it touches the rod the score is 5; if it stops in either circle the score is 4; if it stops in the oblong without touching the rod the score is 3; if it stops anywhere else the score is 0.

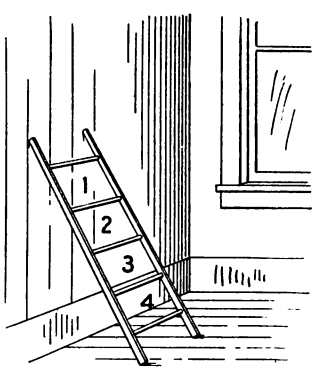


Henry's score was 5, 4, 4, 3, 0, 3.

Jennie's score was 4, 4, 0, 0, 3, 5.

Who won the game?

Place a short ladder against the wall. The children try to throw bean bags through the open spaces of the ladder. The first space counts 1; the second, 2; the third, 3; and the fourth, 4. If a bag strikes the ladder the score is 0.



Ned's score was 3, 2, 0, 0, 4, 1.

Mary's score was 1, 1, 3, 2, 0, 2.

Roy's score was 4, 3, 2, 0, 0, 2.

Who won the game? Why?

The same game may be played with the ladder flat on the floor.

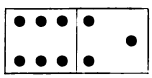
SUBTRACTION

ORAL EXERCISES

1. Here are five pencils. Take one of them. How many pencils are left?

2. Charles had six rabbits and three of them ran away. How many rabbits had he left?

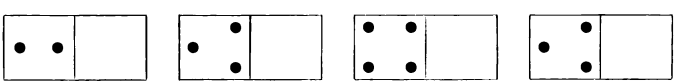
3. Here are 6 squares: ☐ ☐ ☐ ☐ ☐ ☐ Cover one of them. How many do you see? Cover two squares. How many do you see? Cover 3 squares. How many do you see?

4. How many dots are there in this oblong?  Cover the dots in the square at the left. How many dots remain in sight?

5. Hold up 5 fingers. Now close 2 of them. How many fingers do you still hold up?

6. Hold up 5 fingers. Now close 4 of them. How many fingers do you still hold up?

7. Under each of the following oblongs is written the number of dots there should be in the whole oblong. Tell how many dots must be added to each in order to make the number under the oblong.



7 8 9 6

8. You have been taking one number from another and finding what number was left. This *process* is called **subtraction.** *The number left after taking one number from another* is called the **difference.**

9. In writing numbers to be subtracted write the smaller number under the larger number, thus:

$$\begin{array}{r} 9 \\ 3 \\ \hline 6 \end{array}$$

Write the difference below the line, thus:

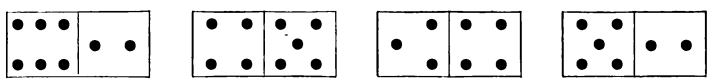
10. Numbers to be subtracted may also be written this way: $9 - 3 = 6$. In reading this, call the sign $-$ *minus* or *less*. You may read $9 - 3 = 6$, 9 *minus* 3 *equal* 6; or 9 *less* 3 *are* 6.

ORAL EXERCISES

1. Read these both ways:

$8-3=5$	$7-4=3$	$7-2=5$	$9-3=6$
$9-6=3$	$9-5=4$	$8-2=6$	$1-1=0$

2. Find the sum of the dots on each card below and subtract the number of dots on the left part from the whole number of dots. Thus: 8 less 6 are 2.



3. From the sum of the dots on each card subtract the number of dots on the right part.

WRITTEN EXERCISES

1. There are 8 roses in the vase; 3 roses are red and the rest are white. How many roses are white?

2. John shot at a mark 9 times. He hit the mark 6 times. How many times did he miss it?

3. A baseball team played 7 games and lost 2 games. How many games did it win?

4. From a pail containing 8 quarts of blueberries Mark poured out 2 quarts. How many quarts were left?

5. A hen hatched all but 3 of the 9 eggs on which she was sitting. How many eggs did she hatch?

6. In a game of hide and seek 7 children hid. When 4 had been found how many were yet in hiding?

7. A farmer had 9 red cows and 5 black cows. How many more red cows did he have than black cows?

ORAL EXERCISES

1. In the table below subtract the numbers in row A in this way: 2 less 1 is 1.

2. The differences in each of the other groups are the same as in A. Subtract the numbers in row B. If not sure you are right, look at the difference in row A just above the numbers you are subtracting.

3. Subtract the numbers in each of the rows C, D, E, F, G, H, I.

	2	3	4	5	6	7	8	9	10
A	1	1	1	1	1	1	1	1	1
	1	2	3	4	5	6	7	8	9
	3	4	5	6	7	8	9	10	11
B	2	2	2	2	2	2	2	2	2
	4	5	6	7	8	9	10	11	12
C	3	3	3	3	3	3	3	3	3
	5	6	7	8	9	10	11	12	13
D	4	4	4	4	4	4	4	4	4
	6	7	8	9	10	11	12	13	14
E	5	5	5	5	5	5	5	5	5
	7	8	9	10	11	12	13	14	15
F	6	6	6	6	6	6	6	6	6
	8	9	10	11	12	13	14	15	16
G	7	7	7	7	7	7	7	7	7

	9	10	11	12	13	14	15	16	17
H	8	8	8	8	8	8	8	8	8

	10	11	12	13	14	15	16	17	18
I	9	9	9	9	9	9	9	9	9

WRITTEN EXERCISES

1. Mary is 19 years old and Lucy is 6 years old. In how many years will Lucy be as old as Mary is now?

2. It is 13 hours from 6 in the morning until 7 at night. If a man works all but 5 hours of that time, how many hours does he work?

3. How many days are there from January 5 to January 16?

4. A newsboy had 17 papers and sold 9 of them. How many papers had he left?

5. There were 18 children at Margaret's birthday party. After 9 of them had gone home, how many remained?

6. John paid 15 cents for a speller and 5 cents for a tablet. How much more did the speller cost than the tablet?

7. Frank has 16 chickens. Of these 7 are black and the rest are brown. How many brown chickens has Frank?

8. Henry has 19 marbles in two pockets. He has 6 marbles in one pocket. How many marbles has he in the other pocket?

9. Dick and Tom together ate 14 cakes for breakfast. Dick ate 9 of them. How many cakes did Tom eat?

10. In a class at school there are 17 scholars of whom 8 are girls. How many boys are there in the class?

ORAL EXERCISES

1. See how quickly you can subtract these:

10	10	10	11	11	14
9	5	6	9	8	7
10	12	11	12	10	14
6	3	7	5	1	6
11	10	13	10	15	15
2	7	9	8	8	9
13	16	13	14	17	18
8	9	7	9	8	9

2. Tell the missing numbers:

2	6	4	5	3	7	8	9
$\overline{1}$	$\overline{3}$	$\overline{2}$	$\overline{0}$	$\overline{1}$	$\overline{4}$	$\overline{5}$	$\overline{6}$
3	5	6	7	8	9	10	9
$\overline{2}$	$\overline{4}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{3}$	$\overline{\quad 6}$	$\overline{4}$
8	7	6	7	8	9	10	9
$\overline{2}$	$\overline{3}$	$\overline{1}$	$\overline{6}$	$\overline{4}$	$\overline{2}$	$\overline{\quad 3}$	$\overline{5}$
5	6	9	4	10	7	9	8
$\overline{1}$	$\overline{2}$	$\overline{7}$	$\overline{1}$	$\overline{\quad 7}$	$\overline{2}$	$\overline{1}$	$\overline{3}$

WRITTEN EXERCISES

Copy the following examples and subtract. First subtract the ones. Next subtract the tens. Check your work by adding the difference and the smaller number. Their sum should equal the larger number.

1.	2.	3.	4.	5.	6.
22	34	45	56	67	78
11	12	23	13	41	15

7.	8.	9.	10.	11.	12.
43	54	65	76	87	89
21	13	22	34	45	16

13.	14.	15.	16.	17.	18.
23	32	36	83	96	78
2	12	13	71	63	27

WRITTEN EXERCISES

1. There are 23 teachers in two school buildings, and 12 of them are in one building. How many teachers are there in the other building?

2. There are 31 days in January. How many days remain after January 11?

3. Mary went to market for her mother. She paid 28 cents for a pound of butter and 22 cents for a pound of cheese. How many more cents did she pay for the butter than for the cheese?

4. Frank has 29 rows of peas. He has hoed 15 rows. How many rows has he still to hoe?

5. Jennie wanted a doll that cost 88 cents. She had only 50 cents. How many more cents did she need to buy the doll?

6. There are 36 books on the top shelf and 22 books on the bottom shelf. How many more books are there on the top shelf than on the bottom shelf?

7. Mary had 36 cherries and ate 22 of them. How many cherries did she have left?

To THE TEACHER. The necessity for drill in the primary subtractions cannot be emphasized too strongly. Keep on the blackboard or on a large cardboard the table of combinations, p. 16, inserting the sums and omitting one of the numbers to be added. Drill the class daily on giving the missing numbers.

The devices on p. 17 should be adapted to the work in subtraction.

Have pupils make tables of differences involving all the combinations that make a certain number, as 8; thus: $8 - 7 = 1$; $8 - 5 = 3$; $8 - 6 = 2$; $8 - 4 = 4$; and so on.

Give profuse drill in counting forward and backward by 2's, 3's, and so on, within the limits of the differences learned.

For *busy work* encourage the pupils to write problems fitting certain subtractions given them; as, "Make a problem about $8 - 5$."

MEASURING

ORAL EXERCISES

1. Name some things that are sold by the yard.

2. Draw a line a yard long. Measure it with a foot rule. How many feet in 1 yard? How many feet in 1 yard and 1 foot?

3. A yard is how many times as long as a foot?

4. Measure the width of the room in yards (omit parts of a yard). Measure this distance in feet. The number of feet is how many times the number of yards?

5. Look at the foot rule. Point to 1 inch of it; point to 6 inches. How many inches are there in a foot?

6. Draw a line one foot long and divide it into inches. How many inches are 6 inches and 6 inches?

7. Point to 4 inches. 1 foot less 4 inches is how many inches?

8. Point to 3 inches. 1 foot less 3 inches is how many inches?

9. Draw a line that you think is a foot long. Measure it.

10. Draw a line that you think is 6 inches long. Measure it.

11. Is the edge of your desk more than a foot long or less than a foot long? Measure it.

12. Is your desk more than a foot high or less than a foot high? Measure it.

13. Cut a piece of string that you think is a yard long. Measure it.

14. Draw a line that you think is 1 inch long. Measure it.

15. Draw a line that you think is 18 inches long. Measure it.

16. How many inches are 1 foot less 5 inches?

17. How many inches are 1 foot less 8 inches?

18. Draw a line that you think is 24 inches long. Measure it.

19. We now know the following

TABLE

12 inches = 1 foot
3 feet = 1 yard

20. For short we write **in.** for inch or inches, **ft.** for foot or feet, and **yd.** for yard or yards. In., ft., and yd. are called *abbreviations*.

WRITTEN EXERCISES

1. 5 ft. + 2 ft. = ?
2. 3 yd. + 4 yd. = ?
3. 2 in. + 8 in. = ?
4. 1 ft. + 1 ft. + 1 ft. = ?
5. 6 in. + 6 in. = ?
6. 9 in. − 6 in. = ?
7. 8 in. − 5 in. = ?
8. 8 ft. − 4 ft. = ?
9. 1 yd. − 1 ft. = ?
10. 1 ft. − 6 in. = ?

11. Jessie bought a yard of ribbon and cut off a foot of it for her doll's sash. How many feet long was the piece that was left?

12. It takes 5 yards of cloth to make a dress and 3 yards to make an apron. How many yards does it take to make both the dress and the apron?

13. From a strip of paper a foot long George cut a piece 7 inches long. How long was the piece that was left?

14. It is 15 feet from Frank's desk to the door. Fred's desk is 1 yard nearer the door. How far is Fred's desk from the door?

15. Harry had a fish line 18 feet long. He cut off a piece 2 yards long. How many feet did he have in the line that was left?

ORAL EXERCISES

1. How many cents in a nickel? How many cents in a dime?

2. How many nickels in a dime?

3. How many nickels equal 15 cents? How many nickels equal 25 cents?

4. One dime and one dime are how many cents?

5. How many cents in 2 dimes and 1 nickel?

6. If I have a dime and spend 5 cents, how many cents have I left?

7. For short we write ¢ or ct. for the word *cents*.

WRITTEN EXERCISES

1. 1 dime − 1 nickel is how many cents?

2. 2 dimes + 2 dimes + 1 nickel is how many cents?

3. John had a toy bank. Monday he put in a dime; Tuesday, a nickel; and Wednesday, 4 cents. How many cents did he put in the bank in the three days?

4. Robert's mother gave him a dime. He bought an orange for 5 cents. How many cents had he left?

5. Jessie bought some candy for a dime, a ball for a nickel, and a stamp for 2 cents. How much did she pay for all?

6. Roy, Fred, and Ellen gave some money to a blind man. Roy gave him a nickel, Fred gave him 3 cents, and Ellen gave him a dime. How many cents did they all give him?

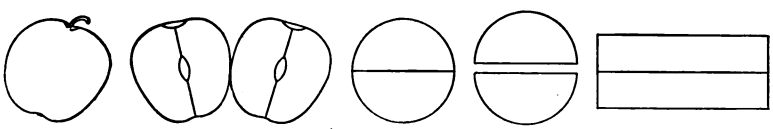
7. A dime and a nickel is how many cents more than 8 cents?

PARTS OF OBJECTS

HALVES

ORAL EXERCISES

1. Into how many equal parts is the apple divided? Into how many equal parts is the circle divided? Into how many equal parts is the oblong divided?



2. What is each part of the apple called? How many halves are there in the apple? How many halves are there in the circle? How many halves are there in the oblong?

3. *One half* of anything is *one of the two equal parts* of it.

4. Draw a line and divide it into halves. Draw an oblong and show one half of it. Show two halves of it.

5. How many halves are there in anything? We write one half, $\frac{1}{2}$; we write two halves, $\frac{2}{2}$.

EXERCISES FOR SEAT WORK

1. Draw a circle. Draw a square. Draw an oblong. Fold each figure in two equal parts and cut along the line of folding. Write $\frac{1}{2}$ on each half figure.

2. Draw three lines and divide each into halves.

3. Draw a line and then draw another one half as long.

4. Draw two oblongs each one half as wide as it is long.

THIRDS

ORAL EXERCISES

1. Draw a line one yard long. Measure it with a foot rule and divide it into feet.

2. Into how many equal parts has the yard been divided? One foot is what part of a yard?

3. *One third* of anything is *one of the three equal parts* of it.

4. Show one third of a yard; two thirds; three thirds. We write one third, $\frac{1}{3}$; two thirds, $\frac{2}{3}$; three thirds, $\frac{3}{3}$.

5. One foot is what part of a yard? Two feet are what part of a yard?

6. Draw a line one foot long. Under it draw a line 8 inches long. Under this draw a line 4 inches long.

1 ft. _____	4 in. equal what part of 1 ft.?
8 in. _____	8 in. equal what part of 1 ft.?
4 in. ____	4 in. equal what part of 8 in.?

7. Show $\frac{1}{2}$ of one foot; $\frac{1}{3}$ of one foot. Which is the greater, $\frac{1}{3}$ or $\frac{1}{2}$?

EXERCISES FOR SEAT WORK

1. Draw three oblongs and divide each into thirds.

2. Cut strips of paper and divide them into thirds, marking each part $\frac{1}{3}$.

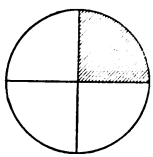
3. Draw two oblongs that are three inches long and one inch wide.

4. Draw two oblongs that are six inches long and one third as wide.

FOURTHS

ORAL EXERCISES

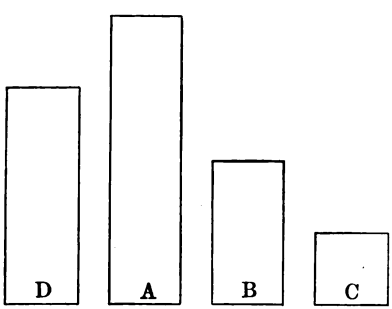
1. Cut a circle out of paper; fold and cut it into halves. Divide each half into two equal parts. Into how many equal parts has the circle been divided?



2. We call each part one fourth. *One fourth* of anything is *one of the four equal parts* of it.

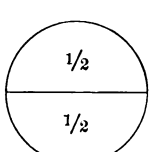
3. How many fourths are there in the circle? How many halves? Show me one fourth of the circle. Show me one half. How many fourths make one half?

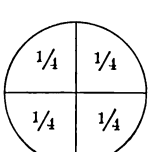
4. In these figures B is what part of A? C is what part of B? C is what part of A? If C is one fourth, B is how many fourths? D is how many fourths? A is how many fourths? One fourth is written $\frac{1}{4}$. Two fourths is written $\frac{2}{4}$. How do you write three fourths? How do you write four fourths?



5. Look at the circles and answer these questions:

$\frac{1}{2} + \frac{1}{2}$ = how many halves?
$\frac{1}{4} + \frac{1}{4}$ = how many fourths?
$\frac{1}{2}$ = how many fourths?
$\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ = how many fourths?
$\frac{1}{4} + \frac{1}{2}$ = how many fourths?





ORAL EXERCISES

1. Here are some children playing soldier. How many children are there? How many girls are there? How many boys? How many children are making music?

2. If the children should march by twos, how many rows would there be? If they should march by threes, how many rows would there be?

3. How many threes are there in six? How many twos are there in six?

4. The number of boys is what part of all the children? The number of children making music is what part of all the children? The number of girls is what part of all the children? What is one half of six? What is one third of six?

5. These children are playing in the snow. How many children are there? How many boys? How many girls?

6. If the children choose sides, how many children will there be on each side?

7. The number of children on one side is what part of all the children? The number of girls is what part of all the children?

8. What is $\frac{1}{2}$ of 6? What is $\frac{1}{3}$ of 6?

9. How many stars are there in this group? In $\frac{1}{3}$ of the group? In $\frac{1}{4}$ of the group? How many are $\frac{1}{4}$ of 4? $\frac{1}{3}$ of 9? We find $\frac{1}{2}$ of 4 stars by dividing the stars into two equal groups, thus: * * * *

* * * *
* * * *
* * * *

10. We find $\frac{1}{3}$ of 9 stars by dividing them into three equal groups, thus:

* * *
* * *
* * *

11. Take 12 toothpicks. Separate them into two equal groups. How many toothpicks are there in each group? $\frac{1}{2}$ of 12 toothpicks are how many toothpicks?

12. Separate the 12 toothpicks into four equal groups. $\frac{1}{4}$ of 12 toothpicks are how many toothpicks? Separate them into three equal groups. $\frac{1}{3}$ of 12 toothpicks are how many toothpicks?

13. There are 12 eggs in a dozen. How many eggs are there in $\frac{1}{2}$ of a dozen? in $\frac{1}{3}$ of a dozen? in $\frac{1}{4}$ of a dozen?

ORAL EXERCISES

1. In a class of 9 pupils $\frac{1}{3}$ are girls. How many girls are there in the class?

2. William had 12 marbles and lost $\frac{1}{4}$ of them. How many marbles did he lose?

3. Jack spent 12 cents and Robert spent $\frac{1}{2}$ as much. How many cents did Robert spend?

4. Susan rode 9 miles one day and $\frac{1}{3}$ as far the next day. How many miles did she ride the second day?

5. Mark counted 12 men on one street car. On another car there were $\frac{1}{3}$ as many men. How many men were there on the second car?

6. If a yard of ribbon costs 20 cents, what will $\frac{1}{2}$ of a yard cost?

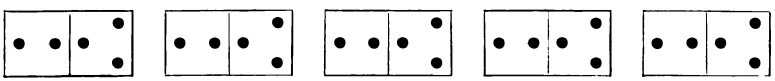
7. A farmer had 15 lambs and sold $\frac{1}{3}$ of them. How many lambs did he sell?

8. Mary found 16 eggs in the barn. On the way to the house she fell down and broke $\frac{1}{4}$ of them. How many eggs did she break?

COUNTING

ORAL EXERCISES

1. Look at the oblongs below. How many dots are there in the left half of each oblong? How many dots are there in the right half of each oblong?



2. Count by 2's the dots on the squares at the left in this way: 2, 4, 6, and so on.

3. Count by 3's the dots on the squares at the right.

4. Give the sum of each of these columns of 2's. Read them, giving first the number of 2's in each column, and then the sum; thus: one 2 is 2; two 2's are 4; and so on.

				2
			2	2
		2	2	2
	2	2	2	2
2	2	2	2	2

5. We may write 2 times 2 this way: 2×2. The sign $\times$ stands for the word *times*. 2×2 are how many? 2×3 are how many? 2×5 are how many?

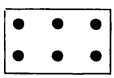
6. Count by 2's to 20; count by 3's to 15.

7. Read the following:

$1 \times 2 = 2$	$6 \times 2 = 12$
$2 \times 2 = 4$	$7 \times 2 = 14$
$3 \times 2 = 6$	$8 \times 2 = 16$
$4 \times 2 = 8$	$9 \times 2 = 18$
$5 \times 2 = 10$	$10 \times 2 = 20$

Read and write this table until you know it by heart.

8. Count the dots in this group by 2's; by 3's. Since in each case the number of dots is the same, we may say either $3 \times 2 = 6$ or $2 \times 3 = 6$. In the same way we may show that $8 = 4 \times 2$ or 2×4; $10 = 5 \times 2$ or 2×5; and so on.



9. Write the table of 2's, beginning each time with 2, thus: $2 \times 2 = 4$; $2 \times 3 = 6$; and so on.

WRITTEN EXERCISES

1. There are 4 eggs in each of two nests. How many eggs are there in the two nests?

2. There are 5 seats in a row and 2 children in each seat. How many children are there in the whole row?

3. There are 7 days in a week. How many days are there in 2 weeks?

4. What is the cost of 2 melons at 8 cents a melon?

5. John gave 2 apples to each of 6 boys. How many apples did he give the boys?

ORAL EXERCISES

1. How many 2's do you see in 4? in 6? in 8? in 10? Read these columns in this way: 2 contains 2 once; 4 contains 2 two times; and so on.

2. We may write the expression 6 contains 2 three times in this way: $6 \div 2 = 3$. The sign $\div$ stands for the words *divided by*.

				2
			2	2
		2	2	2
	2	2	2	2
2	2	2	2	2
2	4	6	8	10

3. Read these:

$2 \div 2 = 1$	$12 \div 2 = 6$
$4 \div 2 = 2$	$14 \div 2 = 7$
$6 \div 2 = 3$	$16 \div 2 = 8$
$8 \div 2 = 4$	$18 \div 2 = 9$
$10 \div 2 = 5$	$20 \div 2 = 10$

You may read the above in this way: 2 in 2, once; 2 in 4, 2 times; and so on.

Read and write this table until you know it by heart.

4. What do these columns show you?

3	2
3	2
6	2
	6

You see that 2 threes make 6 and that 3 twos make 6. You may write these facts in these ways:

$$6 \div 3 = 2 \text{ and } 6 \div 2 = 3.$$

5. How many 4's are there in 8? How many 2's? How many 5's in 10? How many 6's in 12? How many 7's in 14? How many 8's in 16? How many 9's in 18? How many 10's in 20?

6. Complete this table and learn it by heart:

$2 \div 1 =$	$12 \div 6 =$
$4 \div 2 =$	$14 \div 7 =$
$6 \div 3 =$	$16 \div 8 =$
$8 \div 4 =$	$18 \div 9 =$
$10 \div 5 =$	$20 \div 10 =$

WRITTEN EXERCISES

1. Copy and complete:

$7 \times 2 =$	$8 \div 2 =$	$2 \times 3 =$
$6 \times 2 =$	$4 \times 2 =$	$8 \div 4 =$
$10 \div 5 =$	$9 \times 2 =$	$2 \times 8 =$
$18 \div 2 =$	$14 \div 2 =$	$18 \div 9 =$
$12 \div 6 =$	$10 \div 2 =$	$16 \div 2 =$

2. What is $\frac{1}{2}$ of 6? $\frac{1}{2}$ of 4? $\frac{1}{2}$ of 10? $\frac{1}{2}$ of 8? $\frac{1}{2}$ of 12? $\frac{1}{2}$ of 16? $\frac{1}{2}$ of 14? $\frac{1}{2}$ of 18? $\frac{1}{2}$ of 20?

3. At 7 cents a pound, how many pounds of sugar can you get for 14 cents?

4. How many oranges at 2 cents apiece can you buy for 18 cents?

5. There are 20 boys playing a game, an equal number on each side. How many boys are there on each side?

6. Joe lives 7 miles from town and Ray lives twice as far. How far from town does Ray live?

7. There are 2 pints in 1 quart. How many pints are there in 10 quarts of milk?

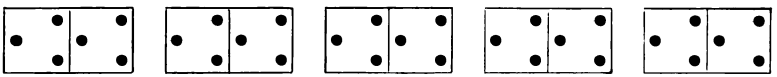
8. How many quarts are there in 10 pints of milk?

9. Fred went to school 16 days in one month. His sister Mary went one half as many days. How many days did she go to school?

10. A baseball nine made 2 runs in each of 9 innings. What was the total score?

11. Jennie's mother gave her 25 cents with which to buy 8 two-cent stamps at the post office. How many cents should she take back to her mother?

ORAL EXERCISES



1. How many oblongs do you see? How many squares are there in each oblong? How many squares in all?

2. How many 3's in each square? Begin at the left and count by 3's all the dots in the squares.

3. How many 3's in one oblong? in two oblongs? in three oblongs? in four oblongs? in five oblongs?

4. How many 3's in one square? in three squares? in five squares? in seven squares? in nine squares?

5. 1×3 are how many? $3 \times 2 = ?$ $4 \times 3 = ?$ $3 \times 4 = ?$

6. Read:

$1 \times 3 = 3$	$6 \times 3 = 18$
$2 \times 3 = 6$	$7 \times 3 = 21$
$3 \times 3 = 9$	$8 \times 3 = 24$
$4 \times 3 = 12$	$9 \times 3 = 27$
$5 \times 3 = 15$	$10 \times 3 = 30$

Read and write this table until you know it by heart.

WRITTEN EXERCISES

1. Write the table of 3's, beginning each time with 3, thus: $3 \times 1 = 3$; $3 \times 2 = 6$; and so on.

2. Look at these columns of 3's. 3 is $\frac{1}{2}$ of what number? $\frac{1}{3}$ of what number? $\frac{1}{4}$ of what number?

$$\begin{array}{ccccc} & & & & 3 \\ & & & 3 & 3 \\ & & 3 & 3 & 3 \\ & 3 & 3 & 3 & 3 \\ \underline{3} & \underline{3} & \underline{3} & \underline{3} & \underline{3} \end{array}$$

3. If you pay 3 cents for a paper of pins, how many cents must you pay for 2 papers? for 3 papers? for 4 papers?

4. What does 3 pounds of sugar cost at 5 cents a pound?

5. How many feet are there in 1 yd.? in 2 yd.? in 3 yd.? in 4 yd.? in 5 yd.?

6. How many pencils at 3 cents each can you buy for 12 cents?

ORAL EXERCISES

1. Look at the oblongs on p. 39. How many 3's in one square? How many 3's in two squares?

2. How many 3's in 6? in 9? in 12? in 15? in 18? in 21? in 24? in 27? in 30?

3. Read these:

$3 \div 3 = 1$	$18 \div 3 = 6$
$6 \div 3 = 2$	$21 \div 3 = 7$
$9 \div 3 = 3$	$24 \div 3 = 8$
$12 \div 3 = 4$	$27 \div 3 = 9$
$15 \div 3 = 5$	$30 \div 3 = 10$

Read and write this table until you know it by heart.

4. You have learned that 6 is equal to either 3×2 or 2×3. That is, $6 \div 3 = 2$ or $6 \div 2 = 3$.

5. Complete this table of 3's and learn it by heart:

$3 \div 1 =$	$18 \div 6 =$
$6 \div 2 =$	$21 \div 7 =$
$9 \div 3 =$	$24 \div 8 =$
$12 \div 4 =$	$27 \div 9 =$
$15 \div 5 =$	$30 \div 10 =$

WRITTEN EXERCISES

1. Copy and complete:

$3 \times 3 =$	$8 \times 3 =$	$3 \times 9 =$
$8 \div 4 =$	$9 \times 3 =$	$6 \times 3 =$
$5 \times 3 =$	$18 \div 6 =$	$3 \times 5 =$
$15 \div 5 =$	$24 \div 3 =$	$3 \times 4 =$
$4 \times 3 =$	$3 \times 7 =$	$24 \div 8 =$
$6 \div 3 =$	$21 \div 3 =$	$27 \div 9 =$
$5 \times 2 =$	$27 \div 3 =$	$3 \times 6 =$
$16 \div 8 =$	$10 \times 3 =$	$30 \div 3 =$

2. Write $\frac{1}{3}$ of 9; $\frac{1}{3}$ of 12; $\frac{1}{3}$ of 15; $\frac{1}{3}$ of 18; $\frac{1}{3}$ of 21; $\frac{1}{3}$ of 24; $\frac{1}{3}$ of 27; $\frac{1}{3}$ of 30.

3. If lemons cost 3 cents each, how many lemons can you buy for 6 cents? for 18 cents? for 24 cents? for 27 cents? for 30 cents?

4. What will 3 quarts of berries cost at 4 ct. a quart? at 5 ct.? at 7 ct.? at 9 ct.?

5. Ralph saved 30 cents in 10 days. How many cents did he save a day?

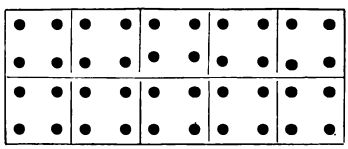
6. Susan picked 3 quarts of berries every day for five days. How many quarts of berries did she pick in the five days?

7. There are 18 apples in a basket. If they are divided equally among three boys, how many apples will each boy receive?

8. Uncle Tom divides 21 roses equally among his three nieces, Maude, Emily, and Dorothy. How many roses did each receive?

ORAL EXERCISES

1. How many dots are there in each square? How many squares are there in the upper row? How many squares are there in the lower row? How many squares are there in both rows?



2. Count these dots by 4's, thus: 4, 8, and so on.

3. Count these dots in this way: one 4 is 4; two 4's are 8; and so on.

4. How many 4's are there in two squares? in three squares? in four squares? in eight squares?

5. There are 4 quarts in 1 gallon. How many quarts are there in 2 gallons? in 3 gallons? in 5 gallons? in 10 gallons?

6. How many are 1×4? How many are 3×4? How many are 5×4? How many are 4×6?

7. A horse has 4 feet. How many feet have 3 horses? How many feet have 5 horses?

8. A square has 4 sides. How many sides have 2 squares? How many sides have 4 squares?

9. Read:

$1 \times 4 = 4$	$6 \times 4 = 24$
$2 \times 4 = 8$	$7 \times 4 = 28$
$3 \times 4 = 12$	$8 \times 4 = 32$
$4 \times 4 = 16$	$9 \times 4 = 36$
$5 \times 4 = 20$	$10 \times 4 = 40$

Read and write this table until you know it by heart.

WRITTEN EXERCISES

1. Write a table of 4's, beginning each time with 4, thus: $4 \times 1 = 4$; $4 \times 2 = 8$; and so on.

2. Look at these columns of 4's. Write one 4 is 4; two 4's are 8; and so on.

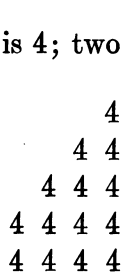
3. What part of 8 is 4? What part of 12 is 4? What part of 16 is 4?

4. For 20 cents how many oranges can you buy at 4 cents apiece?

5. Into how many groups of 4 boys in a group can you divide 12 boys?

6. If there are 4 stalks of corn in a hill, how many stalks are there in 4 hills?

7. It takes 4 shoes to shoe 1 horse. How many shoes does it take to shoe 7 horses.



ORAL EXERCISES

1. Read the columns of 4's above in this way: in 4 there is one 4; in 8 there are two 4's; and so on.

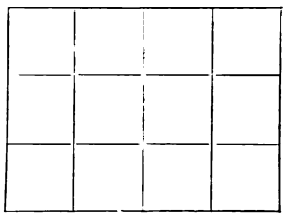
2. How many 4's are there in 8? in 12? in 16? in 20? in 24? in 28? in 32? in 36? in 40?

3. Read:

$4 \div 4 = 1$	$24 \div 4 = 6$
$8 \div 4 = 2$	$28 \div 4 = 7$
$12 \div 4 = 3$	$32 \div 4 = 8$
$16 \div 4 = 4$	$36 \div 4 = 9$
$20 \div 4 = 5$	$40 \div 4 = 10$

Read and write this table until you know it by heart.

4. How many squares are there in each row? How many rows are there? How many squares are 3×4 squares? How many squares are there in one column? How many columns are there? How many are 4×3 squares?



5. $12 \div 4 = ?$ $12 \div 3 = ?$

6. Complete this table of 4's:

$4 \div 1 =$	$24 \div 6 =$
$8 \div 2 =$	$28 \div 7 =$
$12 \div 3 =$	$32 \div 8 =$
$16 \div 4 =$	$36 \div 9 =$
$20 \div 5 =$	$40 \div 10 =$

Read and write this table until you know it by heart.

7. Give these results quickly:

$4 \times 5 =$	$8 \times 4 =$	$12 \div 3 =$	$4 \times 7 =$
$24 \div 4 =$	$36 \div 4 =$	$2 \times 4 =$	$28 \div 7 =$
$7 \times 4 =$	$4 \times 4 =$	$16 \div 4 =$	$9 \times 4 =$
$4 \times 6 =$	$20 \div 5 =$	$32 \div 4 =$	$40 \div 4 =$

WRITTEN EXERCISES

1. A carpenter earned 4 dollars a day. In how many days did he earn 28 dollars?

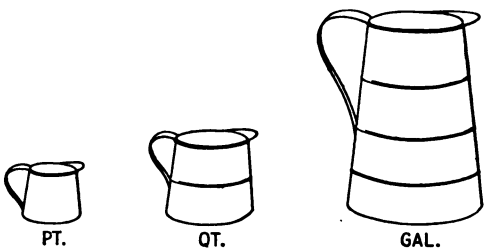
2. There are 4 quarts in 1 gallon. How many quarts in 32 gallons?

3. Write $\frac{1}{4}$ of 8; $\frac{1}{4}$ of 16; $\frac{1}{4}$ of 20; $\frac{1}{4}$ of 12; $\frac{1}{4}$ of 28; $\frac{1}{4}$ of 24; $\frac{1}{4}$ of 36; $\frac{1}{4}$ of 32; $\frac{1}{4}$ of 40.

ORAL EXERCISES

1. Name some things that are sold by the pint. Name some things that are sold by the quart. Name some things that are sold by the gallon.

2. A quart is how many times as large as a pint? A quart of water weighs how many times as much as a pint of water?



3. A pint is what part of a quart?

4. A gallon is how many times as large as a quart? How many quarts make a gallon?

5. What part of a gallon is 1 quart? What part of a gallon is 2 quarts?

6. If a quart of milk costs a nickel, how many nickels will a gallon cost? How many cents?

7. At 20 ct. a quart, what is the cost of a pint of oil?

8. At 40 ct. a gallon, what will a quart of vinegar cost?

9. Two gallons are how many quarts?

10. Two gallons and 1 quart are how many quarts?

11. We now know the following

TABLE

2 pints = 1 quart
4 quarts = 1 gallon

12. For short we write **pt.** for pint or pints, **qt.** for quart or quarts, and **gal.** for gallon or gallons.

WRITTEN EXERCISES

1. $\frac{1}{2}$ of a gal. = how many quarts?
2. $\frac{1}{4}$ of a gal. = how many quarts?
3. $\frac{3}{4}$ of a gal. = how many quarts?
4. 3 qt. + 4 qt. + 1 qt. = how many quarts?
5. 8 qt. = how many gallons?
6. 1 qt. + 1 pt. = how many pints?
7. 3 qt. = how many pints?
8. 3 pt. + 2 pt. + 5 pt. = how many quarts?
9. 10 pt. = how many quarts?

ORAL EXERCISES

1. Count by 5's from 0 to 50. Two nickels equal how many cents? How many cents are 3 nickels? 4? 5? 6? 7? 8? 9? 10?

2. Build columns of 5's until you have ten 5's in the last column.

3. Read these columns thus: one 5 is 5; two 5's are 10; and so on.

				5
			5	5
		5	5	5
	5	5	5	5
5	5	5	5	5

4. Read:

$1 \times 5 = 5$	$6 \times 5 = 30$
$2 \times 5 = 10$	$7 \times 5 = 35$
$3 \times 5 = 15$	$8 \times 5 = 40$
$4 \times 5 = 20$	$9 \times 5 = 45$
$5 \times 5 = 25$	$10 \times 5 = 50$

Read and write this table until you know it by heart.

5. Repeat this table, beginning with 5 each time, thus: $5 \times 1 = 5$; $5 \times 2 = 10$; and so on.

ORAL EXERCISES

1. Look at your columns of 5's. How many times is 5 contained in 10? in 15? in 20? in 25? in 30? in 35? in 40? in 45? in 50?

2. Read this table:

$5 \div 5 = 1$	$30 \div 5 = 6$
$10 \div 5 = 2$	$35 \div 5 = 7$
$15 \div 5 = 3$	$40 \div 5 = 8$
$20 \div 5 = 4$	$45 \div 5 = 9$
$25 \div 5 = 5$	$50 \div 5 = 10$

Read and write this table until you know it by heart.

3. Show by drawing that $5 \times 2 = 2 \times 5$.

4. $10 \div 5 = ?$ $10 \div 2 = ?$

5. Complete this table:

$5 \div \quad = 5$	$30 \div \quad = 5$
$10 \div \quad = 5$	$35 \div \quad = 5$
$15 \div \quad = 5$	$40 \div \quad = 5$
$20 \div \quad = 5$	$45 \div \quad = 5$
$25 \div \quad = 5$	$50 \div \quad = 5$

WRITTEN EXERCISES

1. There are 4 weeks of 5 school days each in a month. How many school days are there in a month?

2. James had 40 cents and Robert had $\frac{1}{4}$ as much. How much money had James and Robert together?

3. At 5 cents an orange, how many oranges can be bought for 40 cents?

4. John had 50 cents. He bought 4 pencils at 5 cents each. How many cents had he left?

5. In an orchard there are 5 rows of trees with 7 trees in each row. How many trees are there in the orchard?

6. A man divides 35 cents equally among 5 children. How many cents does each child receive?

7. It costs 5 cents for each child to ride on an electric car. How many cents does it cost for 9 children to ride on the car?

8. If 1 quart of peanuts costs 5 cents, how many quarts can a boy buy with 40 cents?

DRILL WORK

To the Teacher. 1. Put on the board columns of 2's, 3's, 4's, and 5's, similar to those used in the text, but carried to ten figures in the last column. When the tables given in this chapter are thoroughly learned, use these columns for drill in adding to the multiples. Thus, read these columns of 2's in this way: 2 times 1 and 1 are 3; 2 times 2 and 1 are 5; and so on. Use all the numbers to 9 to be added to the different multiples of 2, 3, 4, and 5.

2. Draw a circle on the board. Put numbers on the circumference within the limits of the table on which the drill is desired. Put the multiplier in the centre of the circle. Adapt this to division and to fraction drill within the limits of this chapter. Vary with other figures as in addition devices. See p. 17.

3. Pupils enjoy playing *teacher* and asking questions for rapid oral drill work in the multiplication and division combinations.

4. Pupils form a circle. One pupil stands in the centre and answers questions put to him by pupils as their names are called by the teacher. The pupil in the centre forfeits his place when he makes a wrong answer. Aim at quick work.

CHAPTER II

READING AND WRITING NUMBERS

ORAL EXERCISES

1. What is another name for ten ones?

Ten and one are how many?

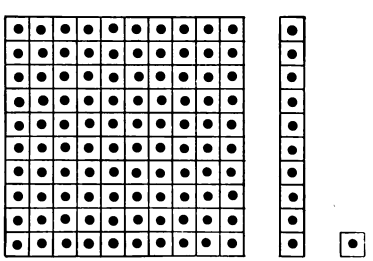
Write eleven. In 11 what does the 1 at the right mean? the 1 at the left?

In 23 what does the 3 mean? What does the 2 mean?

2. What is the largest number that can be written with one figure? What is the largest number that can be written with two figures?

3. Count by tens from ten to one hundred.

4. In this number picture, if we call the picture on the right *one*, what shall we call the middle picture?

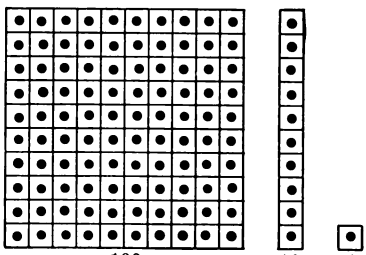


How many ones make a ten? How many tens in the large picture?

5. We call ten tens **one hundred.** We write one hundred, 100; two hundred, 200; three hundred, 300.

6. Write four hundred. How many figures do you use? The figure at the right shows how many ones there are. The second figure shows how many tens there are. The figure at the left shows how many hundreds there are.

7. This picture shows 1 *hundred*, 1 *ten*, and 1 *one*; that is, one hundred eleven, written 111.



8. Write two hundreds, two tens, and two ones, or two hundred twenty-two.

9. Write one hundred twenty-three. What does each figure mean?

10. Read the following numbers and tell what each figure means, thus: three hundred thirty-three means 3 hundreds, 3 tens, 3 ones.

333	225	327	498	876
825	320	307	400	505
290	311	560	708	910
606	234	110	99	901

WRITTEN EXERCISES

Write these numbers in figures and place them in columns, ones under ones, tens under tens, and hundreds under hundreds:

One hundred, two tens, three ones
Three hundreds, four tens, six ones
One hundred thirty-seven
Six hundred fifty-nine
Nine hundred seventy-eight
Eight hundred fifty
Seven hundred
Nine hundred one

Nine hundred ten
Eighty
Six hundred thirty-three
Three hundred six
Three hundred sixty
Twenty-seven
One hundred eighty
Nine hundred ninety
Nine hundred ninety-nine
Three hundred seventy-four
Five hundred eighty-seven
Six hundred fourteen
Two hundred twenty-six
One hundred fifty-one

ROMAN NUMERALS

ORAL EXERCISES

1. The Romans used seven capital letters in writing numbers. By repeating and combining these letters all the other numbers were written.

These letters are:

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

2. Read these numbers. What kind of numbers are these?

I II III IV V VI VII VIII IX X XI XII.

Where have you seen them used?

3. 20 is written XX. How is 30 written?

4. If one or more letters of a smaller value are placed *after* another letter, the number formed is equal to their *sum*, thus: VI means $5+1$; XII means $10+2$; XVI means $10+5+1$.

5. Read the numbers of these chapters:

XVIII	XVII	XXV	XIX
$10+8$	$10+7$	$20+5$	$10+9$

6. If a letter of smaller value is placed *before* another letter, the number formed equals their *difference*, thus: IV means $5-1$; IX means $10-1$.

7. Read these numbers:

IX	IV	XL	XC
$10-1$	$5-1$	$50-10$	$100-10$

8. Write the numbers from X to XX. Write the numbers from XXX to XL.

9. L = ? LV = ? LIX = ? LXX = ? C = ? XC = ? CX = ?

10. LXXVIII = ? $50+20+8$ XLIX = ? $50-10+9$

WRITTEN EXERCISES

1. Write these numbers in Roman numerals:

10; 20; 30; 40; 50; 60; 70; 100.

2. Change these Roman numerals to figures:

IX; XIX; XXV; XL; XLV; LVII; LXXV; XC; CX; XCI; LXXXVIII.

ADDITION

ORAL EXERCISES

1. Add 1 to each number from 10 to 20, giving the sums only.

2. In the same way, add 2 to each number from 10 to 20; add 3 to each number from 30 to 40; add 4 to each number from 80 to 90; add 5 to each number from 50 to 60; add 6 to each number from 20 to 30; add 7 to each number from 10 to 20; add 8 to each number from 70 to 80; add 9 to each number from 10 to 20.

3. Add 2 to every number between 11 and 93 that ends in 2, as 12, 22, 32, and so on. Give the sums only.

4. Add 3 to every number between 12 and 94 that ends in 3.

5. In 14 there are how many tens? How many ones? In 20 there are how many tens?

6. 20 and 10 are how many?

20 and 10 and 4 are how many?

In adding 20 and 14 you may say, "Twenty and ten are thirty and four are thirty-four."

In this way add the following:

7.	8.	9.	10.	11.	12.	13.
20	30	40	50	60	70	80
14	15	16	17	18	19	19

14.	15.	16.	17.	18.	19.	20.
70	40	60	20	80	30	50
18	15	16	12	17	19	13

Look at these numbers:

$54 = 50 + 4$, or 5 tens and 4 ones
$38 = 30 + 8$, or 3 tens and 8 ones
The sum is $80 + 12$, or 8 tens and 12 ones

Add 54 and 38.

54
38
12 = the sum of the ones
8 = the sum of the tens
92 = the sum of the numbers

It is shorter and better to add this way:

8 ones and 4 ones are 12 ones. 12 ones is the same as 1 ten and 2 ones. Write the 2 in the ones column. Add the 1 ten to the 3 tens and the 5 tens, and write the sum in the tens column.

54
38
92

WRITTEN EXERCISES

Add these numbers:

1.	2.	3.	4.	5.	6.
24	35	39	44	37	28
38	27	46	28	19	42
7.	**8.**	**9.**	**10.**	**11.**	**12.**
11	47	39	22	57	19
79	29	56	69	16	48
13.	**14.**	**15.**	**16.**	**17.**	**18.**
21	34	42	17	47	26
35	16	18	43	34	55
28	29	23	24	15	18

19.	20.	21.	22.	23.	24.
6	25	17	20	16	19
11	15	3	17	26	21
23	36	28	33	36	27
44	14	32	16	6	18

WRITTEN EXERCISES

1. There are 31 days in March and 30 days in April. How many days are there in these two months together?

2. There are 29 apples in one basket and 37 apples in another basket. How many apples are there in the two baskets together?

3. Frank weighs 49 pounds and Henry weighs 39 pounds. How many pounds do they together weigh?

4. Henry has 46 cents in his bank. If he puts in 28 cents more, how many cents will he then have in his bank?

5. One morning Anna went on the train from Boston to visit her aunt and returned in the evening. Her aunt lived 45 miles from Boston. How many miles did Anna travel in going to and from her aunt's?

6. Write the eight numbers between 17 and 90 that end in 8, as below, and add 5 to each.

18	28	38	48	58	68	78	88
5	5	5	5	5	5	5	5

7. Write again these eight numbers ending in 8, and add to each 7; 8; 9; 4; 3; 2; 6.

8. Write the eight numbers between 15 and 90 that end in 6, and add 7 to each.

9. Write again these eight numbers ending in 6, and add to each 6; 8; 4; 5; 9; 2; 3.

10. Write the eight numbers between 17 and 90 that end in 9, and add 6 to each.

NOTE. Vary these exercises, using numbers with different endings.

11. The sign that means *dollars* is written $. We read $24 thus, twenty-four dollars. When this sign is written before the first number in a column to be added, it should be written in the sum also.

ORAL EXERCISES

Add:

1.	2.	3.	4.
$20	$17	$28	$17
12	24	12	12
31	16	21	21
$	$	$	$

5. Read: 25 yd.; 24 ft.; 32 in.; 14 gal.; 17 qt.; 36 pt.

Add and read the sums:

6.	7.	8.	9.	10.	11.
16 yd.	27 ft.	36 in.	$38	26 yd.	57 ft.
24	45	27	28	39	33
41	26	22	19	24	8

12.	13.	14.	15.	16.	17.
$17	22 in.	41 ft.	$26	18 yd.	12 ft.
41	30	12	31	10	43
10	24	23	12	40	33
30	18	12	30	21	9

Add 236, 453, and 275.

Write the numbers in columns, ones under ones, tens under tens, and hundreds under hundreds as here shown.

$$\begin{array}{r} 236 \\ 453 \\ 275 \\ \hline 964 \end{array}$$

Begin at the bottom to add. The sum of the ones is 14. Write the 4 under the ones, and add the 1 to the tens column. The sum of the tens is 16. Write the 6 under the tens column and add the 1 to the hundreds. The sum of the hundreds is 9. The sum of the three numbers is 964.

WRITTEN EXERCISES

Add:

1.	2.	3.	4.	5.
234	166	375	196	123
307	424	162	214	345
283	216	218	375	276
212	323	443	287	384

Copy and add. *Check* your work by adding the numbers downwards. If your work is correct, the sums should be the same when you add downwards as when you add upwards.

6.	7.	8.	9.	10.	11.	12.	13.
92	65	93	95	35	44	62	98
88	49	26	85	47	84	76	22
67	56	85	94	56	76	81	15
83	58	34	16	66	33	27	45
49	27	72	23	74	32	45	61
51	87	47	77	84	27	83	29

14.	15.	16.	17.
$275	345	$189	248
386	182	221	311
7	98	37	129
123	204	9	65
45	76	26	128

18.	19.	20.	21.
125 qt.	304 gal.	192 ft.	123 yd.
217	122	89	304
86	38	43	125
34	48	212	61
108	217	164	124
271	109	99	106

WRITTEN EXERCISES

1. A man had three farms. The first contained 160 acres, the second 128 acres, and the third 80 acres. How many acres were there in the three farms?

2. A man paid $225 for a horse and $175 for a carriage. How much did he pay for both together?

3. There are three school buildings in a town. In the Washington School there are 427 pupils; in the Lincoln School, 382 pupils; in the Lowell School, 165 pupils. How many pupils are there in the three schools?

4. John, Charles, and Ralph were running a race. John was 126 ft. ahead of Charles and Charles was 84 ft. ahead of Ralph. How far behind John was Ralph?

NOTE. Use the devices for drill work suggested on pp. 16 and 17, adapting them to the limits of this chapter.

SUBTRACTION

ORAL EXERCISES

1. Subtract 1 from each number from 10 to 20, giving the differences only.

2. In the same way, subtract 2; 3; 4; 5; 6; 7; 8; 9.

3. Subtract 2 from every number that ends in 2 from 12 to 52.

4. Subtract 3 from every number that ends in 4 from 14 to 54.

5. Subtract these quickly:

34	45	56	67	78	89
20	30	40	50	60	70

6. Subtract these quickly:

34	45	56	67	78	89
22	22	22	22	22	22

When one number is to be subtracted from another number the larger number is called the **minuend** and the smaller number is called the **subtrahend.**

From 45 take 26.

Write the numbers in columns, ones under ones and tens under tens. Begin at the ones to subtract. We cannot take 6 ones from 5 ones. So we take 1 ten from the 4 tens and put it with the 5 ones, making 15 ones. 6 ones from 15 ones leaves 9 ones. 2 tens from the 3 tens remaining leaves 1 ten. The remainder is 1 ten and 9 ones, or 19.

Minuend	45
Subtrahend	26
Remainder	19

This shows what we did:

$$\begin{array}{ll} 45 = 30 + 15 & 26 \\ 26 = 20 + \ 6 & 19 \\ \hline 19 = 10 + \ 9 & 45 \end{array}$$

Check the work by adding the subtrahend and the remainder. If your work is correct, this sum should equal the minuend.

WRITTEN EXERCISES

Subtract and check:

1.	2.	3.	4.	5.	6.
53	46	35	74	65	92
27	18	19	27	38	33
7.	**8.**	**9.**	**10.**	**11.**	**12.**
85	63	51	66	42	87
46	29	37	47	19	49
13.	**14.**	**15.**	**16.**	**17.**	**18.**
33	44	45	57	58	62
14	29	19	28	29	13
19.	**20.**	**21.**	**22.**	**23.**	**24.**
71	38	46	81	92	84
28	19	37	26	37	46
25.	**26.**	**27.**	**28.**	**29.**	**30.**
55	37	43	62	95	57
28	18	17	25	36	18

WRITTEN EXERCISES

1. Frank has 87 stamps in his collection and Robert has 69 stamps. How many more stamps has Frank than Robert?

2. James has two hens. The white hen laid 37 eggs in the season and the speckled hen laid 56 eggs. How many more eggs did the speckled hen lay than the white hen?

3. A street is 92 ft. wide. An alley 14 ft. wide opens into the street. How much wider is the street than the alley?

4. Frank's father husked 62 bushels of corn while Frank husked 27 bushels. How many more bushels did his father husk than Frank husked?

5. A man is 52 years old and his son is 24 years. In how many years will the son be as old as the father now is?

6. Jennie's father gave her 75 cents to spend for Christmas. She paid 37 cents for a comb for her mother. How many cents had she left?

ORAL EXERCISES

1. Subtract 2 from every number between 11 and 51 that ends in 1.

2. From the same numbers subtract 3; 4; 5; 6; 7; 8; 9.

3. Complete the following, then read:

\$25 − \$9 =	42 yd. − 7 yd. =	18 gal. − 9 gal. =
\$47 − \$8 =	83 yd. − 9 yd. =	45 gal. − 7 gal. =

4. A grocer sold $41 worth of sugar one day and $23 worth the next day. How many more dollars' worth did he sell the first day than the second?

5. There were 64 shocks of corn in a field. The farmer husked 42 shocks. How many shocks are not husked?

Subtract, giving the differences only:

6.	**7.**	**8.**	**9.**	**10.**
20	200	300	400	500
10	100	200	200	300

11.	**12.**	**13.**	**14.**	**15.**
220	330	440	550	666
110	220	220	330	333

From 546 take 257.

Write ones under ones, tens under tens, hundreds under hundreds. We cannot take 7 ones from 6 ones. So we take 1 ten from the 4 tens and put it with the 6 ones. 7 ones from 16 ones leaves 9 ones. Write the 9 in the ones place. We cannot take 5 tens from the 3 tens left out of the 4 tens. So we take 1 hundred from the 5 hundreds and put it with the 3 tens. This makes 13 tens. 5 tens from 13 tens leaves 8 tens. Write the 8 in the tens place. 2 hundreds from the 4 hundreds remaining leaves 2 hundreds. The remainder is 289.

$$\begin{array}{r} 546 \\ 257 \\ \hline 289 \end{array}$$

This shows what we did:

$$\begin{aligned} 546 &= 400 + 130 + 16 \\ 257 &= 200 + \ 50 + \ 7 \\ \hline 289 &= 200 + \ 80 + \ 9 \end{aligned}$$

Now check the work by adding: 257
289
546

NOTE. Do not allow the pupil to form the weakening habit of writing the *borrowed* figures at the side. The reduction should be wholly mental.

WRITTEN EXERCISES

Subtract and check the work:

1.	2.	3.	4.	5.
332	453	685	581	626
196	138	286	327	218

6.	7.	8.	9.	10.
457	375	843	782	441
169	194	129	193	207

11. Subtract 319 from 605.

We cannot take 9 ones from 5 ones and there are no tens. So we take 1 hundred from the 6 hundreds and call it 10 tens. Now we can take 1 of these tens and put it with the 5 ones, making 15 ones. 9 ones from 15 ones leaves 6 ones. 1 ten from the 9 tens remaining leaves 8 tens. 3 hundreds from the 5 hundreds remaining leaves 2 hundreds.

605
319
286

This shows what we did:

	Check
$605 = 500 + 90 + 15$	319
$319 = 300 + 10 + 9$	286
$286 = 200 + 80 + 6$	605

WRITTEN EXERCISES

Subtract and check:

1.	2.	3.	4.	5.
506	403	606	702	801
127	229	218	129	147

6.	7.	8.	9.	10.
407	305	807	304	502
209	196	108	199	318

11.	12.	13.	14.	15.
604	505	408	302	905
127	326	219	219	108

16.	17.	18.	19.
$824	926 gal.	734 yd.	515 yd.
119	218	248	206

20.	21.	22.	23.
$917	325 yd.	426 qt.	265 gal.
408	108	209	129

24.	25.	26.	27.
406	$306	205	507 yd.
207	168	145	319

28. A man had $605 in the bank and drew out $107. How much money had he left?

29. In an election Mr. Jones received 875 votes and Mr. Hall received 649 votes. How many more votes did Mr. Jones receive than Mr. Hall?

30. A man owned a farm of 640 acres and sold 165 acres. How many acres had he left?

31. A playground is 225 ft. long and 106 ft. wide. How many feet longer than wide is the playground?

32. The attendance at a school on Monday was 592, and on Tuesday it was 548. How many pupils were absent Tuesday?

33. There are 365 days in a year. After 259 days have passed, how many days is it until the end of the year?

34. From 500 take 236.

Take 1 hundred from the 5 hundreds and change it to 10 tens. Take 1 ten from the 10 tens and change it to 10 ones. Then 6 ones from 10 ones leaves 4 ones. 3 tens from the remaining 9 tens leaves 6 tens. 2 hundreds from the remaining 4 hundreds leaves 2 hundreds. The remainder is 264.

500
236
264

WRITTEN EXERCISES

Subtract:

1.	2.	3.	4.	5.	6.
300	400	500	600	700	800
128	237	345	471	554	249
7.	**8.**	**9.**	**10.**	**11.**	**12.**
607	405	306	407	504	601
219	217	128	138	246	174
13.	**14.**	**15.**	**16.**	**17.**	**18.**
710	851	675	423	907	811
509	642	290	219	115	602

		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
19.	1.	11	21	31	41	51	61	71	81	91
	2.	12	22	32	42	52	62	72	82	92
	3.	13	23	33	43	53	63	73	83	93
	4.	14	24	34	44	54	64	74	84	94
	5.	15	25	35	45	55	65	75	85	95
	6.	16	26	36	46	56	66	76	86	96
	7.	17	27	37	47	57	67	77	87	97
	8.	18	28	38	48	58	68	78	88	98
	9.	19	29	39	49	59	69	79	89	99
	10.	20	30	40	50	60	70	80	90	100

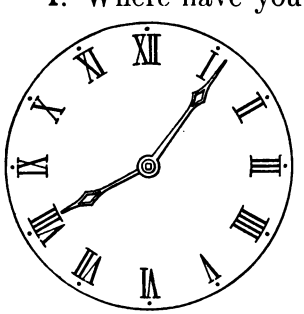
Subtract 16 from each number in column (*d*); from each number in column (*f*). Subtract 18 from each number in line 9; from each number in line 10.

NOTE. By varying the numbers the above exercise will serve both for seat work and for oral drill in subtracting by endings.

MEASURING

ORAL EXERCISES

1. Where have you seen a clock? Is there a clock in your schoolroom? Of what use is a clock? How many hands does it have? The short hand is called the hour hand because it tells the number of hours. The long hand is called the minute hand. What does it tell? Have you learned to tell time by a clock?



2. The figures on the face of a clock are Roman numerals. They are:

I,	II,	III,	IIII,	V,	VI,
1	2	3	4	5	6
VII,	VIII,	IX,	X,	XI,	XII.
7	8	9	10	11	12

3. Point to 12 on the clock; to 3; to 6; to 9; to 7.

4. It takes the hour hand one hour to pass from I to II. How long does it take it to pass from II to III? from III to IIII? from X to XII?

5. The minute hand takes 5 minutes to pass from I to II. How many minutes does it take it to pass from I to III?

6. Beginning with I, point to each numeral in order and count by 5's from 5 to 60, thus: 5, 10, 15, and so on.

7. How many minutes are there in one hour? Show how far the minute hand goes in one hour; in 15 minutes; in 30 minutes; in 45 minutes.

8. 15 minutes are what part of 1 hour? 30 minutes are what part of 1 hour?

9. When the hour hand points to I and the minute hand to XII, it is one o'clock. When the hour hand points to III and the minute hand to XII, what time is it?

10. When the hour hand points to III and the minute hand to I, it is 5 minutes past three o'clock.

11. What time is it when the minute hand is at II and the hour hand a little past III?

12. What time is it by the clock in the picture?

13. The hour hand passes over the circle twice in one day. How many hours is it from noon to the next noon? from midnight to the next midnight? How many hours are there in one day?

14. We now know the following

TABLE

60 minutes = 1 hour
24 hours = 1 day

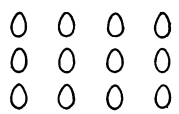
15. For short we write **min.** for minute or minutes; **hr.** for hour or hours; and **da.** for day or days.

NOTE. The time from midnight to noon is called *forenoon*. The time from noon to midnight is called *afternoon*. We write A.M. for forenoon and P.M. for afternoon.

ORAL EXERCISES

1. How many eggs in a dozen? Point to a half dozen; a fourth of a dozen; a third of a dozen.

2. How many 3's are there in a dozen? How many 4's? How many 6's?



3. Name some things that are sold by the dozen.

4. 6 is what part of a dozen? 4 is what part? 3 is what part?

5. A dozen oranges cost 40 ct. What will 6 oranges cost?

6. A dozen bananas will cost how many times as much as 3 bananas?

7. 1 dozen pencils − 2 pencils are how many pencils?

8. A dozen eggs cost 20 ct. How much will 4 eggs cost?

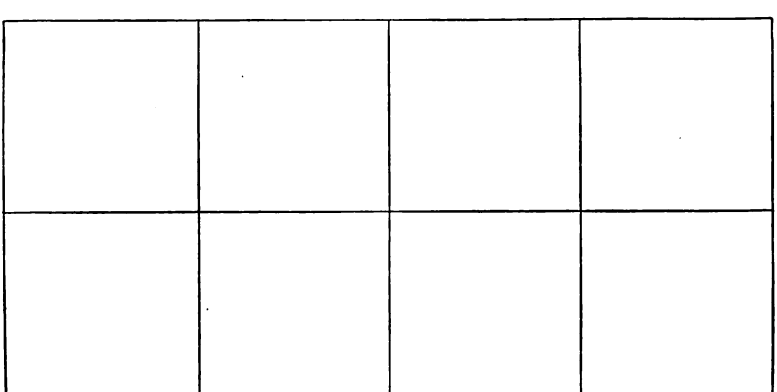
9. A dozen inches = what?

REVIEW EXERCISES

1. How many inches in a foot? 6 inches are what part of a foot? 4 inches? 8 inches? 3 inches? 9 inches?
2. How many feet in a yard? in 2 yd.? in $2\frac{1}{3}$ yd.?
3. How many quarts in a gallon? in 4 gal.?
4. A quart is what part of a gallon? 3 qt. are what part of 1 gal.?
5. How many pints are there in $3\frac{1}{2}$ qt.?
6. How many minutes in an hour? in $\frac{1}{2}$ hr.? in $\frac{1}{4}$ hr.?
7. How many hours in a day? in $\frac{1}{2}$ da.? in $\frac{1}{3}$ da.?
8. A dozen is how many? $\frac{1}{2}$ dozen? $\frac{1}{4}$ dozen? $\frac{3}{4}$ dozen?
9. For short we write **doz.** for dozen.
10. 1 yd. and 2 ft. are how many feet?
11. 1 ft. and 4 in. are how many inches?

PERIMETER AND AREA

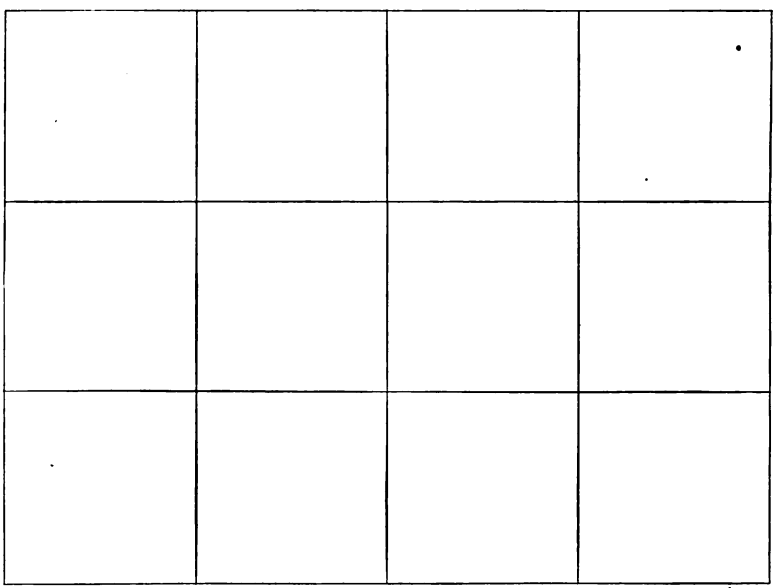
Draw an oblong 4 inches long and 2 inches wide.



The distance around this oblong is called the **perimeter.** 4 inches + 2 inches = $\frac{1}{2}$ of the perimeter. How many inches are there in the perimeter?

Draw an oblong 6 inches long and 4 inches wide. Show the perimeter. 6 in. + 4 in. = $\frac{1}{2}$ of the perimeter. How long is the perimeter?

Draw an oblong 4 inches long and 3 inches wide.



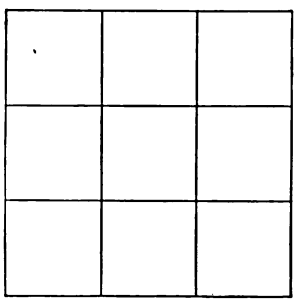
Divide it into 12 squares. Each square is how long?

A square 1 inch long is called a square inch.

How many square inches in one row? How many rows in the oblong? 3×4 square inches is how many square inches? We call this the **area** of the oblong.

ORAL EXERCISES

1. Draw a square 3 inches long and divide it into square inches. How many square inches in one row? How many rows of three square inches? What is the area of the square? What is the perimeter?



2. Draw a 4-inch square and divide it into square inches. How many square inches in one row? How many rows of 4 square inches? What is the area of the 4-inch square? What is the perimeter?

3. Draw a square foot on the blackboard. Draw a square yard. Divide the square yard into square feet. How many square feet are there in one row? How many rows are there? How many square feet are there in a square yard?

4. How many square feet in a rug 4 feet long and 2 feet wide?

5. Find the area of a 2-inch square; of a 6-inch square; of a 10-inch square.

WRITTEN EXERCISES

1. Draw these forms and find the perimeters and areas:

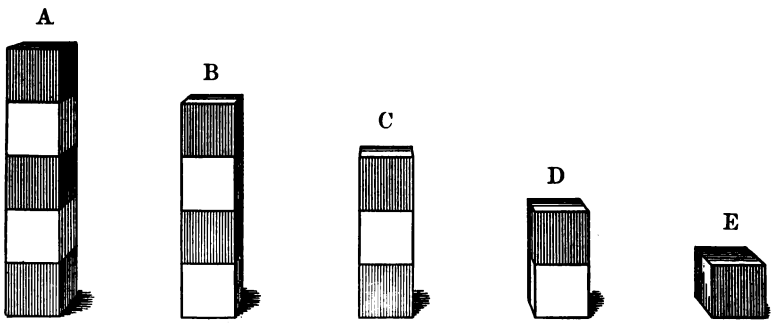
An oblong 5 inches long and 3 inches wide; a 2-inch square; an oblong 4 inches by 2 inches; a 3-inch square; an oblong 7 inches by 3 inches; a 5-inch square.

2. Draw three different oblongs, using 12 one-inch squares. Find the perimeter of each.

PARTS OF OBJECTS

WRITTEN EXERCISES

1. Draw a line 10 inches long. Draw another 2 inches long. The 2-inch line is what part of the 10-inch line?



2. Look at the blocks in the picture. Show $\frac{1}{5}$ of A; $\frac{2}{5}$ of A; $\frac{3}{5}$ of A; $\frac{4}{5}$ of A. Point to $\frac{1}{4}$ of B; to $\frac{2}{4}$ of B; to $\frac{3}{4}$ of B.

3. Show that $\frac{1}{4}+\frac{1}{4}=\frac{1}{2}$; $\frac{1}{4}+\frac{1}{2}=\frac{3}{4}$; $\frac{2}{5}+\frac{2}{5}+\frac{1}{5}=1$; $\frac{1}{3}+\frac{2}{3}=1$.

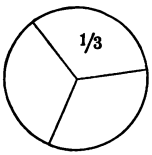
4. Show that $1=\frac{2}{5}+\frac{3}{5}$; $\frac{4}{5}-\frac{2}{5}=\frac{2}{5}$; $1-\frac{1}{3}=\frac{2}{3}$; $\frac{3}{4}-\frac{1}{2}=\frac{1}{4}$.

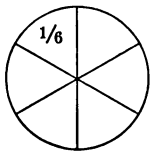
5. If we call A 1, what shall we call E? D? C? B?

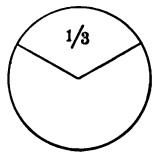
6. If we call B 1, what shall we call E? D? C?

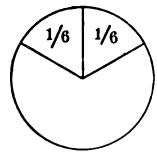
ORAL EXERCISES

1. If we divide a circle into thirds and cut each third into halves, how many equal parts will we have? What is each part called? How many sixths of a circle in 1 circle? in 2 circles? in 2 and $\frac{1}{6}$ circles?





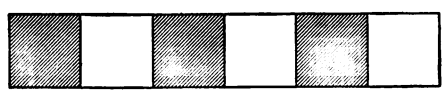




2. Jane gave $\frac{1}{6}$ of a pie to Ellen, $\frac{1}{6}$ to Ruth, and $\frac{1}{6}$ to John. How many sixths did she give away? How many sixths had she left?

3. John's mother gave him $\frac{1}{3}$ of a pie and he gave $\frac{1}{2}$ of his piece to Ray. What part of the pie did Ray receive?

4. Show $\frac{1}{3}$ of this oblong; $\frac{1}{6}$ of it. $\frac{1}{6}$ is what part of $\frac{1}{3}$?

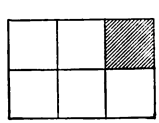


$\frac{1}{3}$ = how many sixths?
$\frac{1}{2}$ = how many sixths?
$\frac{1}{2}+\frac{1}{6}$ = how many sixths?
$\frac{1}{3}+\frac{1}{6}$ = how many sixths? $\frac{1}{2}+\frac{1}{3}$ = how many sixths?

5. $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$ = how many sixths? $\frac{5}{6}-\frac{1}{6}$ = how many sixths?

WRITTEN EXERCISES

1. This oblong shows that $1-\frac{1}{6}=\frac{5}{6}$. Draw oblongs and shade them to show these: $1-\frac{5}{6}=\frac{1}{6}$; $\frac{1}{2}=\frac{3}{6}$; $1-\frac{1}{2}=\frac{3}{6}$; $\frac{1}{3}=\frac{2}{6}$; $\frac{2}{3}=\frac{4}{6}$; $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{1}{2}$; $\frac{1}{6}+\frac{1}{6}=\frac{1}{3}$; $1-\frac{1}{3}=\frac{2}{3}$.



2. Draw an oblong 6 inches long and 1 inch wide. Draw others $\frac{1}{6}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$ as long.

3. Call the largest oblong 1 and name the others.

REVIEW EXERCISES

1. I spent $\frac{2}{3}$ of my money. What part had I left?

2. At 40 ct. a gallon, what will a quart of vinegar cost? What will a pint cost?

3. If 1 yd. of ribbon costs 12 ct., what will $\frac{1}{4}$ yd. cost?

4. There are 12 months in a year. What part of a year is 3 months? 9 months? 4 months? 8 months? 6 months?

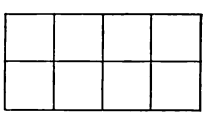
5. What is $\frac{1}{2}$ of 8 inches? $\frac{1}{4}$ of 8 inches? $\frac{1}{3}$ of 9 yards? $\frac{2}{3}$ of 9 yards? $\frac{1}{5}$ of 25 cents? $\frac{3}{5}$ of 25 cents?

6. How many inches in $\frac{1}{3}$ ft.? in $\frac{1}{2}$ ft.? in $1\frac{1}{2}$ ft.?

7. At 16 cents a pound, what must you pay for $\frac{1}{2}$ pound of grapes? for $\frac{1}{4}$ pound?

ORAL EXERCISES

1. Point to $\frac{1}{2}$ of this oblong; $\frac{1}{4}$ of it; $\frac{1}{8}$ of it. $\frac{1}{8}$ is what part of $\frac{1}{4}$? $\frac{1}{4}$ = how many eighths? $\frac{1}{2}$ = how many eighths? How many eighths are $\frac{1}{2}+\frac{1}{4}$? $\frac{1}{2}+\frac{1}{8}$?



2. Shade $\frac{1}{8}$ of the oblong. $1-\frac{1}{8}$ = how many eighths? Shade $\frac{3}{8}$ of the oblong. $1-\frac{3}{8}$ = how many eighths?

3. In the same way show that $1-\frac{7}{8}=\frac{1}{8}$; that $1-\frac{5}{8}=\frac{3}{8}$.

4. In what two ways could you shade the oblong to show $\frac{1}{2}$? to show $\frac{1}{4}$?

DRAWING EXERCISES

1. Draw a line 8 inches long; one 4 inches long; one 2 inches long; one 1 inch long. What part of the 8-inch line is the 2-inch line? is the 4-inch line? is the 1-inch line? $\frac{1}{4}+\frac{1}{2}+\frac{1}{8}$ = how many eighths?

2. Draw an 8-inch line and mark it off in inches. Show the sum of $\frac{1}{8}+\frac{1}{4}$; $\frac{1}{8}+\frac{3}{8}$; $\frac{1}{8}+\frac{3}{4}$; $\frac{1}{8}+\frac{7}{8}$; $\frac{3}{8}+\frac{5}{8}$.

3. Draw an oblong 4 inches long and 2 inches wide and divide it into 8 equal squares. Show by shading that $\frac{1}{2}=\frac{4}{8}$; $\frac{1}{4}=\frac{2}{8}$; $\frac{3}{4}=\frac{6}{8}$.

ORAL EXERCISES

1. Draw a line 1 foot long and divide it into thirds. Divide each third into halves. $\frac{1}{6}$ is what part of $\frac{1}{3}$? $\frac{2}{3}$ = how many sixths?

2. Point to $\frac{1}{3}$ of the line. What is $\frac{1}{2}$ of $\frac{1}{3}$ of it? Point to $\frac{1}{2}$ of the line. What is $\frac{1}{3}$ of $\frac{1}{2}$ of it?

3. How many sixths of a foot in $\frac{2}{3}$ ft.? in $\frac{1}{2}$ ft.?

4. How many sixths are there in 1? in 2? in 2 and $\frac{1}{6}$?

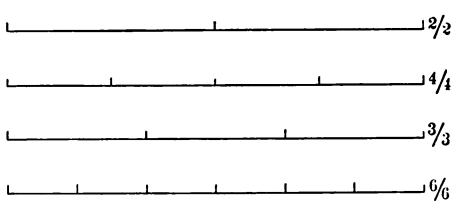
5. How many sixths are $\frac{6}{6} - \frac{1}{6}$? $1 - \frac{1}{6}$? $\frac{6}{6} - \frac{1}{3}$? $1 - \frac{5}{6}$? $\frac{1}{3} + \frac{1}{2} + \frac{1}{6}$?

6. How many thirds of a foot in 1 ft.? in 2 ft.? in $2\frac{1}{3}$ ft.?

ORAL EXERCISES

1. Draw a line 1 ft. long. Divide it into halves. How many inches in $\frac{1}{2}$ ft.?

2. Divide the line into fourths. How many inches in $\frac{1}{4}$ ft.? in $\frac{3}{4}$ ft.? $\frac{1}{2}$ ft. = how many fourths of a foot?



3. Divide the line into thirds. How many inches in $\frac{1}{3}$ ft.? in $\frac{2}{3}$ ft.?

4. Divide the line into sixths. How many inches in $\frac{1}{6}$ ft.? in $\frac{5}{6}$ ft.? in $\frac{4}{6}$ ft.? in $\frac{3}{6}$ ft.? in $\frac{2}{6}$ ft.? $\frac{1}{3}$ = how many sixths? $\frac{2}{3}$ = how many sixths?

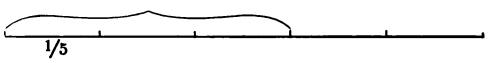
5. Draw a line 10 inches long and divide it into fifths. Divide it into tenths. How many tenths in $\frac{1}{5}$? in $\frac{2}{5}$? in $\frac{3}{5}$? in $\frac{4}{5}$? in $\frac{1}{2}$?

DRAWING EXERCISES

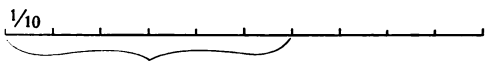
1. Draw oblongs 3 inches long and 2 inches wide and divide them to show that $\frac{1}{2} = \frac{3}{6}$; $\frac{1}{3} = \frac{2}{6}$; $\frac{2}{3} = \frac{4}{6}$.

2. Draw oblongs 4 inches long and 2 inches wide and divide them to show that $\frac{1}{2} = \frac{4}{8}$; $\frac{1}{4} = \frac{2}{8}$; $\frac{3}{4} = \frac{6}{8}$.

3. Draw lines and divide them to show that $\frac{6}{10} = \frac{3}{5}$, thus:



4. Draw lines and divide to show that



$\frac{5}{10} = \frac{1}{2}$; $\frac{4}{10} = \frac{2}{5}$; $\frac{4}{12} = \frac{1}{3}$; $\frac{9}{12} = \frac{3}{4}$; $\frac{2}{12} = \frac{1}{6}$; $\frac{8}{12} = \frac{2}{3}$.

5. Draw lines and divide them to show that $\frac{1}{3} = \frac{3}{9}$; $\frac{2}{3} = \frac{6}{9}$; $\frac{3}{3} = \frac{9}{9}$; $\frac{1}{2} = \frac{6}{12}$; $\frac{1}{4} = \frac{3}{12}$; $\frac{3}{4} = \frac{9}{12}$.

MULTIPLICATION AND DIVISION

ORAL EXERCISES

1. How many are 2×3? 3×4? 5×3?

2. $2 \times 10 = ?$ $3 \times 10 = ?$ $4 \times 10 = ?$

3. 2×4 ones are how many ones? 2×6 ones? 3×3 tens are how many tens?

4. $22 + 22 + 22 + 22 = ?$ $4 \times 22 = ?$

WRITTEN EXERCISES

1. Numbers to be multiplied are usually written in this way:

22	4×2 ones = how many ones?
4	4×2 tens = how many tens?
88	8 tens and 8 ones = ?

2. We have combined 4 equal numbers into one number. We call this **multiplication.** Multiplication is a short way of adding equal numbers.

3. In multiplying 22 by 4 we call 22 the **multiplicand;** we call 4 the **multiplier** and 88 the **product.**

4. Multiply 33 by 2. What is the multiplicand? What is the multiplier? What is the product?

5. Find the products:

22	32	43	34	44	42	12	23	32
2	2	2	2	2	2	3	3	3

22	21	33	24	31	21	14	13	33
3	3	2	2	3	2	2	3	3

6. If one overcoat costs $32, what should 3 overcoats cost?

7. What is the cost of 3 dozen eggs at 22 ct. a dozen?

8. If one little doll costs 3 ct., what should 12 dolls cost?

9. There are 13 telephone wires on one pole. On another pole there are 3 times as many. How many wires are there on this pole?

10. The A class read 21 pages of their reader in 1 week. How many pages should they read in 3 weeks?

11. If steak costs 21 ct. a pound, what should be paid for 4 pounds?

12. Find the products:

41	52	61	63	72	81	42	53	62	73
4	3	2	3	4	4	4	3	4	2

13. Multiply 43 by 5.

43	
5	
15	What is the product of the ones?
20	What is the product of the tens?
215	What is the entire product?

14. It is shorter to multiply this way:

43	5×3 ones are 15 ones. Write the 5 in the
5	ones place and add the 1 ten to the 5×4
215	tens, making 21 tens. The product is 215.

WRITTEN EXERCISES

1. Find the products:

35	45	55	65	75	85	43	44	54
3	5	3	5	3	5	5	3	4
63	46	38	99	36	64	26	33	27
4	2	3	2	3	4	4	4	3

2. How many hours are there in 3 days?

3. How many quarts are there in 32 gallons?

4. An oblong is 22 inches long and 3 inches wide. How many square inches are there in the area?

5. George wrote 44 words and Roy wrote 3 times as many. How many words did Roy write?

6. How many pounds of tea are there in three packages, each containing 27 pounds?

7. A flower bed is 16 feet long and 3 feet wide. What is the area?

8. Our schoolroom seats 42 pupils. How many pupils may be seated in 4 rooms like this room?

9. How many cherry trees are there in 4 rows if there are 17 cherry trees in each row?

10. A cat has 18 toes. How many toes have 6 cats?

11. A clock that strikes only the hours strikes 156 times in a day. How many times will a clock strike in a week?

ORAL EXERCISES

1. How many times can you take 3 pencils from a box that contains 15 pencils?

2. Into how many groups of 3 children in each group can you arrange 15 children?

3. How many times is 3 ft. contained in 15 ft.? How many times is 4 qt. contained in 16 qt.? How many times is 5 yd. contained in 25 yd.?

4. If you divide 12 marbles equally among 4 boys, how many marbles will each boy receive?

WRITTEN EXERCISES

1. $15 \div 5 = ?$ What is $\frac{1}{5}$ of 15?

You have learned these two ways of showing that 15 is divided by 5. Here is another way:

$5)\overline{15}$
$\quad 3$

Each of these numbers has a name. 15 is the **dividend**; 5 is the **divisor**; 3 is the **quotient.**

In what three ways can you show that 12 is divided by 4? Which number is the dividend? Which is the divisor? Which is the quotient?

2. Find the quotients:

2)64	3)96	4)48	3)63	3)39	4)84	5)55
2)462	2)822	5)555	3)363	2)646	4)408	2)428

3. What is $\frac{1}{3}$ of 360? $\frac{1}{3}$ of 336? $\frac{1}{4}$ of 884? $\frac{1}{4}$ of 480? $\frac{1}{5}$ of 550? $\frac{1}{3}$ of 624?

4. Check your work: *The product of the divisor and quotient should equal the dividend.*

ORAL EXERCISES

1. How many are 4×3 and 1? 4×3 and 2?

2. How many 3's are there in 12? In 14 there are four 3's and 2 over. This 2 is called the **remainder.**

3. 5 is contained in 16 how many times? What is the remainder?

4. 4 is contained in 10 how many times? What is the remainder?

5. Divide each of these numbers by 3 and give the quotient and the remainder: 7, 8, 10, 11, 13, 16, 17, 19.

6. Divide each of these numbers by 4 and give the quotient and the remainder: 9, 13, 17, 19, 21, 22. Divide each number by 5 and give the quotient and the remainder.

WRITTEN EXERCISES

1. Divide 26 by 6.

$$6\overline{)26}$$

4, 2 remainder.

Check

$$\begin{array}{r} 4 \\ \times\ 6 \\ \hline 24 + 2 = 26 \end{array}$$

2. To check the work: *Multiply the quotient by the divisor and add the remainder to the product.* This sum should equal *the dividend.*

3. Find the quotients and the remainders:

2)223	4)486	5)557	3)368	2)247	4)845
3)337	2)449	5)506	3)634	3)394	4)447

4. Mary has 25 cents. How many dolls at 6 cents apiece can she buy with the money? How much money will she have left?

5. 4×6 and 1 are how many? $25 \div 6 = ?$

6. George had 27 cents. He bought some pencils for 5 cents apiece and had 2 cents left. How many pencils did he buy?

7. 5×5 and 2 are how many? $27 \div 5 = ?$

8. 22 quarts of oil will fill how many one-gallon cans? How many quarts will be left over?

9. 4×5 and 2 are how many? $22 \div 4 = ?$

10. Jessie bought 3 oranges at 5 cents apiece and had 4 cents left. How many cents had she at first?

WRITTEN EXERCISES

1. A horse cost \$250 and a carriage cost $\frac{1}{2}$ as much. What did the carriage cost?

2. A farmer raised 440 bushels of potatoes and sold $\frac{1}{4}$ of them. How many bushels did he sell?

3. In a parade 448 men walked four abreast. How many lines of four men were there?

4. A man saved $633 in three years. How much did he save a year?

5. There are 505 school children in a certain town, and $\frac{1}{5}$ of them are in the Washington School. How many pupils are there in this school?

6. How many gallons are there in 484 quarts?

7. John's kite string measures 393 feet. How many yards does it measure?

8. A dozen buttons cost 8 cents. How many cents will 3 buttons cost?

9. A dozen pears can be bought for 18 cents. For how many cents can 4 pears be bought?

REVIEW EXERCISES

1. What time is it when the minute hand points to XII and the hour hand points to VI? when the hour hand points to IX and the minute hand to XII?

2. Carl picked 21 qt. of berries and sold them at 7 ct. a quart. How much did he receive for them?

3. How many yards of carpet will it take to lay one strip in a hall 63 ft. long?

4. The children held a show in the barn. They charged 4 pins admission and earned 48 pins. How many children paid their admission?

5. How many feet of fence will be needed to inclose a lot 200 ft. long and 100 ft. wide?

6. In a race some boys ran 212 yards to a fence and then ran back to the point of starting. How many yards did each boy run?

7. A man had \$565 in a bank and drew out \$472. How many dollars did he have left in the bank?

8. In a basket of 48 apples $\frac{1}{4}$ were spoiled. How many good apples were there in the basket?

9. Ethel has 63 postal cards and Ruth has $\frac{1}{3}$ as many. How many postal cards has Ruth?

10. An automobile cost \$960. A horse and carriage cost $\frac{1}{3}$ as much. How many dollars did the horse and carriage cost?

11. How many school days are there in a term of 14 weeks? How many in a term of 18 weeks?

12. What is the cost of a gallon of milk at 6 cents a quart?

13. Mary had a yard of ribbon. She cut off a piece a foot long. What part of the yard was left?

14. A man earns \$20 a week and spends $\frac{1}{4}$ of his wages for board. How many dollars does he spend for board?

15. How many square feet in a rug 4 ft. long and 2 ft. wide? How many feet of braid will it take to bind the ends of the rug?

16. John has $\frac{1}{5}$ of 30 marbles. How many marbles has he?

17. Jessie went to visit her aunt. The train left the city at 9 A.M. and arrived at the town in which her aunt lived at 1 P.M. on the same day. How many hours did it take Jessie to make the trip?

18. George's bicycle cost \$21 and his father's cost 3 times as much. How much did his father's bicycle cost?

19. Edward bought marbles at the rate of 9 for a cent. How many marbles did he buy for 15 cents?

20. Jennie had 20 cents and bought an orange for 5 cents and a postage stamp for 2 cents. How many cents had she left?

21. What is the cost of a gallon of olive oil at 40 cents a quart?

22. At 12 cents apiece, what is the cost of the shoes for one horse?

23. Grace has 1 dime, 2 nickels, and 3 cents. How much money has she?

24. From a roll of carpet 50 yd. long 3 pieces each 8 yd. long are sold. How many yards are left in the roll?

25. 2 ft. and 6 in. = how many inches?

26. 5 yd. and 2 ft. = how many feet?

27. 1 hr. and 20 min. = how many minutes?

28. How many pints are there in 3 gal. 2 qt.?

29. There are 16 pupils in one class and twice as many in another. How many pupils are there in both classes?

30. Martha's father bought a set of 5 books for $35. How much did each book cost?

31. When cookies are worth 10 cents a dozen, what are $\frac{1}{2}$ of a dozen worth? What are 2 dozen worth? What are $2\frac{1}{2}$ dozen worth?

32. John and George counted the carriages and the automobiles that passed their house in the city in an hour. John counted 27 automobiles and George counted 4 times as many carriages. How many carriages did he count?

33. Jennie bought a box of paper for 25 cents, some pens for 10 cents, and 6 two-cent postage stamps. How much did she pay in all?

34. James had 50 cents and spent 22 cents for a baseball and 15 cents for a bat. How many cents had he left?

35. A clerk wrote 12 letters Monday and twice as many Tuesday. How many letters did he write in both days?

36. October has 31 days, November 30 days, and December 31 days. How many days are there from October 1 to January 1?

37. In going from Chicago to California Lucy started Monday noon and arrived the next Friday noon. How many days did it take for the journey?

38. One night she went to bed at 9 P.M. and arose the next morning at 7 A.M. How many hours was she in bed?

39. The milkman buys milk for 20 ct. a gallon and sells it for 6 ct. a quart. How much does he gain on a gallon? How much on a quart?

40. The telephone office is between First Street and Second Street. It is 216 ft. from First Street and 228 ft. from Second Street. How long is the block?

41. It is 488 miles from Chicago to Omaha and 225 miles from Chicago to Cedar Rapids. How far is it from Cedar Rapids to Omaha?

42. Monday a man deposited in the bank $45; Tuesday, $32; Wednesday, $48; Thursday, $100. How much more must he deposit to make $500 in all?

43. There are 48 pages in Chapter I of a book that contains five chapters. Chapter II contains 44 pages, Chapter III contains 46 pages, and Chapter IV contains 40 pages. There are 232 pages in the whole book. How many pages are there in Chapter V?

44. Write in figures these Roman numerals:

I =	XV =	XXIX =	XCI =
II =	XVI =	XXX =	XCII =
III =	XVII =	XL =	XCIII =
IV =	XVIII =	XLV =	XCIV =
V =	XIX =	LI =	XCV =
VI =	XX =	LII =	XCVI =
VII =	XXI =	LIII =	XCVII =
VIII =	XXII =	LIV =	XCVIII =
IX =	XXIII =	LV =	XCIX =
X =	XXIV =	LVI =	CVIII =
XI =	XXV =	LVII =	CL =
XII =	XXVI =	LVIII =	CCIX =
XIII =	XXVII =	LIX =	CCXX =
XIV =	XXVIII =	LX =	CCXLV =

45. Harry bought 3 bunches of firecrackers at 5 cents a bunch, and an air gun for 80 cents. What did he pay for the air gun and the firecrackers?

46. $\frac{1}{2}$ of 30 inches = how many inches?

47. Sarah and her brother together have 60 cents. Sarah has 45 cents. How many cents has her brother?

48. A flower bed is 4 feet long and 3 feet wide. What is the distance around it?

49. There are 5 shelves in a bookcase, and each shelf holds 22 books. How many books does the bookcase hold?

50. Ruth bought 3 pencils at 4 cents apiece and gave the clerk two dimes. How many cents in change did she receive?

51. A rope was cut into four equal pieces, and each piece was 32 feet long. How long was the rope?

52. In a schoolroom containing 35 desks there are 5 rows. How many desks are there in each row?

DRILL EXERCISES

1. Add 1 to each of these numbers:

11	21	31	41	51	61	71	81	91
1	1	1	1	1	1	1	1	1

In the same way add to each of these numbers 2; 3; 4; 5; 6; 7; 8; 9.

2. Subtract 2 from each of the numbers in the last exercise. Subtract 3; 4; 5; 6; 7; 8; 9.

3. Write all the numbers that end in 2 from 12 to 92. As in the last exercise, add to each 1; 2; 3; 4; and so on.

4. From these numbers subtract 1; 2; 3; 4; and so on.

5. Continue this exercise, taking all the numbers between 10 and 100 that end in each: 3, 4, 5, 6, 7, 8, 9.

Write them like this:

13	23	33	43	53	63	73	83	93
3	3	3	3	3	3	3	3	3

Add:

6.	7.	8.	9.	10.	11.
23	31	27	36	47	75
35	49	33	67	51	24
47	36	29	73	68	37
72	53	32	21	33	22

Add:

12.	13.	14.	15.	16.	17.
36	67	76	89	98	57
84	74	88	37	65	84
39	38	31	53	29	37
46	21	19	27	37	18

18.	19.	20.	21.	22.	23.
56	67	78	89	92	83
22	23	24	25	26	27
48	36	29	37	45	82
31	24	16	42	38	15

24.	25.	26.	27.	28.
$134	$407	$123	$108	206 yd.
402	62	346	119	87
67	38	287	223	34
84	104	149	306	192
92	98	89	114	208
124	21	64	89	142

29.	30.	31.	32.	33.
87 ft.	121 gal.	365 da.	122 qt.	407 pt.
9	208	87	189	188
103	116	92	167	64
481	92	114	159	92
78	148	108	102	25
122	77	115	188	163

Find the differences:

34.	35.	36.	37.	38.
225	313	321	337	235
87	56	28	89	88

39.	40.	41.	42.	43.
312	482	563	671	817
147	279	392	289	465

44.	45.	46.	47.	48.
476	567	675	576	637
279	378	387	378	239

49.	50.	51.	52.
$648	$375	$864	$933
219	126	426	365

53.	54.	55.	56.
$716	$814	$903	$812
208	317	267	428

57.	58.	59.	60.
811 gal.	421 gal.	531 gal.	641 gal.
227	306	417	518

61.	62.	63.	64.
675 yd.	345 yd.	615 yd.	425 yd.
209	178	286	217

65.	66.	67.	68.
424 in.	334 in.	544 in.	734 in.
106	187	186	198

69.	70.	71.	72.
816 qt.	476 qt.	316 qt.	953 qt.
209	288	207	167

ORAL EXERCISES

1. To each of these products add 1:

$2 \times 1 =$	$3 \times 1 =$	$4 \times 1 =$	$5 \times 1 =$
$2 \times 2 =$	$3 \times 2 =$	$4 \times 2 =$	$5 \times 2 =$
$2 \times 3 =$	$3 \times 3 =$	$4 \times 3 =$	$5 \times 3 =$
$2 \times 4 =$	$3 \times 4 =$	$4 \times 4 =$	$5 \times 4 =$
$2 \times 5 =$	$3 \times 5 =$	$4 \times 5 =$	$5 \times 5 =$
$2 \times 6 =$	$3 \times 6 =$	$4 \times 6 =$	$5 \times 6 =$
$2 \times 7 =$	$3 \times 7 =$	$4 \times 7 =$	$5 \times 7 =$
$2 \times 8 =$	$3 \times 8 =$	$4 \times 8 =$	$5 \times 8 =$
$2 \times 9 =$	$3 \times 9 =$	$4 \times 9 =$	$5 \times 9 =$
$2 \times 10 =$	$3 \times 10 =$	$4 \times 10 =$	$5 \times 10 =$

To each of the above products add 2; add 3; add 4; add 5; add 6; add 7; add 8; add 9.

Multiply:

2.	**3.**	**4.**	**5.**	**6.**	**7.**
23	45	68	72	85	92
2	5	3	3	4	5
8.	**9.**	**10.**	**11.**	**12.**	**13.**
73	84	96	38	87	75
3	4	2	4	3	4
14.	**15.**	**16.**	**17.**	**18.**	**19.**
29	86	77	87	94	86
3	4	3	5	4	5
20.	**21.**	**22.**	**23.**	**24.**	**25.**
76	49	84	66	71	89
4	3	5	3	5	3

26.	27.	28.	29.	30.
123	342	125	321	126
3	2	5	2	4
31.	**32.**	**33.**	**34.**	**35.**
233	134	302	108	214
2	4	2	4	3
36.	**37.**	**38.**	**39.**	**40.**
233	129	144	241	137
3	5	4	2	5
41.	**42.**	**43.**	**44.**	**45.**
241	123	204	128	241
4	5	2	3	3

WRITTEN EXERCISES

Find the cost:

1. Of 2 overcoats at $23 each.
2. Of 3 bicycles at $45 each.
3. Of 4 tables at $16 each.
4. Of 5 wagons at $47 each.
5. Of 3 pounds of steak at 24 cents a pound.
6. Of 5 yards of silk at 76 cents a yard.
7. Of 4 cows at $46 each.
8. Of 3 horses at $112 each.
9. Of 4 suits of clothes at $34 a suit.
10. Of 5 bedsteads at $17 each.
11. At $3 each, how many hats can be bought for $69?
12. At $4 each, how many chairs will $84 buy?

13. At \$2 a dozen, how many dozen knives cost \$144?

14. At \$2 a yard, how many yards of velvet can be bought for \$320?

15. At \$3 each, how many lamps will \$396 buy?

16. At 4 cents a box, how many boxes of matches will 84 cents buy?

17. At 2 cents each, how many postage stamps can be bought for 64 cents?

18. At 5 cents each, how many pencils will cost 90 cents?

19. At 4 cents a pound, how many pounds of salt can be bought for 64 cents?

20. At 5 cents a quart, how many quarts of milk will 80 cents buy?

21. At \$6 for each calf, how many calves can be bought for \$84?

22. At \$8 for a ton, how many tons of coal can be bought for \$120?

23. Divide:

2)224	3)394	5)550	4)488	3)637
3)189	4)244	2)487	3)159	4)164
5)207	2)843	4)235	5)350	3)842
2)648	5)250	3)336	2)845	4)245
3)399	2)486	4)815	5)257	3)934
5)355	4)848	2)423	2)623	3)666
2)267	3)990	4)889	2)825	4)485

CHAPTER III

READING AND WRITING NUMBERS

ORAL EXERCISES

1. Count by tens from ten to one hundred.

2. Name all the numbers from fifty to sixty; from seventy to eighty; from ninety to one hundred.

3. In the number 234 what place does the 4 occupy? What place does the 3 occupy? What place does the 2 occupy?

4. What is the largest number that can be written with two figures? with three figures?

5. The number one more than nine hundred ninety-nine is **one thousand,** written 1000.

6. How many figures are required to write one thousand? In what place, counting from the right, is tens? In what place is hundreds? In what place is thousands?

7. Count by hundreds from 100 to 1000.

8. How many tens are there in a hundred? How many hundreds in a thousand?

9. Count from one thousand to one thousand twenty; from one thousand fifty to one thousand sixty.

10. Read 2000, 3000, 4000, 9000.

11. Write twenty-two; two hundred twenty-two; two thousand two hundred twenty-one.

12. Read these numbers:

1000	2465	6400	2780
1234	4628	2790	6760
1230	3727	6084	8205
1200	5642	9009	9067

13. In giving dates, house numbers, and at other times we sometimes take the thousands and hundreds together and call them hundreds, thus: 1728 is sometimes read seventeen hundred twenty-eight instead of one thousand seven hundred twenty-eight. Read these numbers both ways:

1907	1492	1776	1861
1232	2150	1820	1862
7854	5236	3141	5900
8649	9206	2647	7646

WRITTEN EXERCISES

1. Write in figures, keeping ones under ones, tens under tens, and so on:

One thousand three hundred forty-five
Nine hundred seventy
Two thousand four hundred sixty
Three thousand seven hundred eighty-nine
Seventeen hundred seventy-six
One thousand one hundred ten
Three thousand forty-five
Six thousand ninety-six
Seven thousand seven
Nine thousand nine hundred ninety-nine

2. In the same way write in figures these numbers:

Eighteen hundred eighty-seven
Five thousand eight
Seven thousand eight hundred seventy-six
Four thousand twenty-five
Eight thousand six hundred forty-five

3. Write all the numbers between 1850 and 1869; between 2100 and 2121; between 3222 and 3243; between 4456 and 4475.

ROMAN NUMERALS

ORAL EXERCISES

1. Name the six letters which are called the Roman numerals. Tell the value of each.

2. Change the following Roman numerals to figures:

IX, XX, LX, C, CXV, D, M.

3. Roman numerals are sometimes used in writing dates, thus:

M D CCC
1000 + 500 + 300 = 1800.

Sometimes Roman numerals are placed on a building to show the year in which it was built.

4. Change the numbers of these years to Roman numerals: 1901; 1905; 1907; 1875; 1643; 1815.

5. M D CCC XC III = what?
1000 + 500 + 300 + 90 + 3

6. Read MDCCLXXVI.

WRITTEN EXERCISES

Copy the sentences, changing the Roman numerals to figures:

1. Columbus discovered America in MCDXCII.

2. George Washington was born in MDCCXXXII.

3. The World's Fair was held in Chicago in the year MDCCCXCIII.

4. Change the numbers of these years to Roman numerals: 1600; 1905; 1607; 1043.

ADDITION

ORAL EXERCISES

1. Charles put into the bank at one time \$12, at another time \$8, and at another time \$9. How many dollars did he put into the bank all together?

2. Ruth is 7 years old, Mabel is 9 years old, and Clara is 8 years old. The sum of their ages equals that of their aunt. How old is the aunt?

3. There are 18 children in the A class and 22 children in the B class. How many children are in both classes?

4. Anna paid 15 cents for some tablets and 5 cents for paper. How much did she pay in all?

5. Robert saw 6 birds in one tree, 7 birds in another tree, and 8 birds on the ground. How many birds did he see in all?

6. Add 6 to each of the numbers from 25 to 35. Give the sums only.

7. To the same numbers add 7; add 8; add 9.

8. See how quickly you can give the sum of these numbers, beginning at the left. Read 15, 21, and so on.

$$7+8+6+5+5+3+6+4+8+9+4+6$$

9. Add the following:

7	17	27	37	47	57	67	77	87	97
2	2	2	2	2	2	2	2	2	2

10. In the same way, make an addition table showing all the sums not larger than 100 that result from adding 3 to numbers ending in 7.

Complete the table by adding to the same numbers in the same way 4; 5; 6; 7; 8; 9.

NOTE. The above suggests a form of drill work that may be varied, taking numbers with different endings.

In adding columns of figures, learn to add by groups instead of adding one figure at a time. The columns in the following exercises are partially arranged to help you. The first one may be read 8, 18, 28, 37.

11.	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**
9	6	2	6	3	7	9	8	6	3
2	6	8	4	7	0	3	4	4	3
8	3	7	5	4	5	7	3	4	3
6	3	5	2	3	8	3	7	2	8
4	4	10	8	4	7	4	5	3	1
3	3	2	7	8	9	8	5	4	5
5	5	3	4	9	1	7	4	6	5

WRITTEN EXERCISES

1. We add numbers of more than three places in exactly the same way as we added those of three places.

2. Add 2975 and 3458.

Write in columns the numbers to be added, ones under ones, tens under tens, hundreds under hundreds, and thousands under thousands. 8 and 5 are 13. Write the 3 in the ones place and add the 1 to the tens. The sum of the tens is 13. Write the 3 in the tens place and add the 1 to the hundreds. The sum of the hundreds is 14. Write the 4 in the hundreds place and add the 1 to the thousands. The sum of the thousands is 6. The sum of the two numbers is 6433.

```
 2975
 3458
 6433
```

Add and check your work:

3.	4.	5.	6.
3426	3468	2487	4268
1347	2482	2113	1146
1562	3396	4205	2562

7. You have learned to write 24 dollars; thus, $24. If you wish to write 24 dollars and 17 cents, you put a period between the dollars and the cents; thus, $24.17.

Add:

8.	9.	10.	11.
$36.18	$67.26	$28.94	$16.89
24.22	14.89	16.73	25.98
15.85	13.25	34.52	24.79
$	$	$	$

12.	13.	14.	15.
$39.25	$41.98	$25.75	$36.43
19.16	27.93	15.46	1.79
1.04	1.87	23.84	25.24
22.78	6.49	4.96	2.56
10.89	20.17	1.99	14.27
$	$	$	$

WRITTEN EXERCISES

1. One load of hay weighed 2184 pounds and another weighed 1867 pounds. How many pounds did both loads together weigh?

2. An excursion train was run in three sections. The first section carried 482 persons; the second section carried 386 persons; the third section carried 398 persons. How many persons were carried by the three sections?

3. A man bought a house, paying at one time $1850, at another time $650, and at another time $475. How much did he pay for the house?

4. A man earned in one week $12.50, in another week $9.75, and in another week $11.25. How much did he earn in the three weeks?

5. What is the distance around a lot in the shape of an oblong 264 ft. long and 132 ft. wide?

6. If it is 286 miles from Chicago to St. Louis, 413 miles from St. Louis to Omaha, and 488 miles from Omaha to Chicago, how far would a man travel in making this journey?

7. Frank paid $8.25 for hens, $11.45 for ducks, and $9.65 for geese. How much did he pay in all?

SUBTRACTION

ORAL EXERCISES

1. From \$1 take 50 cents; take 25 cents; take 75 cents.
2. From 50 cents take 40 cents; take 15 cents.
3. From a half dollar take a quarter dollar and a nickel.
4. See how quickly you can make this change: 18 cents from a quarter dollar; 43 cents from a half dollar; 65 cents from 75 cents.
5. Suppose you buy an article of a merchant for 16 cents, and give him in payment a quarter of a dollar. He will say 16; give you 4 cents and say 20; then give you 5 cents and say 25.
6. In this way make change from 50 cents, taking out 27 cents, saying 27, 30, 40, 50.
7. In this way make change from \$1 for these purchases: 85 cents; 88 cents; 75 cents; 65 cents; 43 cents; 72 cents.

DRILL EXERCISES

1. Subtract:

11	21	31	41	51	61	71	81	91
2	2	2	2	2	2	2	2	2

From these same numbers subtract 3; 4; 5; 6; 7; 8; 9.

2. Subtract:

12	22	32	42	52	62	72	82	92
3	3	3	3	3	3	3	3	3

From these same numbers subtract 4; 5; 6; 7; 8; 9.

3. Subtract:

91	92	93	94	95	96	97	98	99
2	2	2	2	2	2	2	2	2

From these same numbers subtract 3; 4; 5; 6; 7; 8; 9.

Subtract:

4.	5.	6.	7.
500	610	1800	2700
300	410	1600	1500

WRITTEN EXERCISES

1. From 6461 take 4598.

In subtracting numbers of four figures proceed with the ones and tens, as you did on p. 62, thus: 8 from 11 leaves 3; 9 from 15 leaves 6. You cannot take 5 hundreds from the 3 hundreds remaining, so from the 6 thousands you take 1 thousand, or 10 hundreds, and put it with the 3 hundreds remaining. 5 hundreds from 13 hundreds leaves 8 hundreds. 4 thousands from 5 thousands leaves 1 thousand. Always check your work by adding the subtrahend and remainder.

6461
4598
1863

Subtract:

2.	3.	4.	5.
6231	8423	4253	3762
2354	2546	2365	1945

6.	7.	8.	9.
7435	4352	6544	8206
2346	2364	3546	4427

Subtract:

10.	11.	12.	13.
4258	6379	4820	7251
2269	1489	1921	4366
14.	**15.**	**16.**	**17.**
5002	3057	4506	9510
1234	1169	1651	5447
18.	**19.**	**20.**	**21.**
4000	7000	3000	6000
2234	4365	1829	5123
22.	**23.**	**24.**	**25.**
6051	7063	8046	5045
1432	2554	6257	1689
26.	**27.**	**28.**	**29.**
8022	6045	6407	4102
7514	3138	2319	1219

30. A man was born in Germany in the year 1868 and came to the United States in 1892. How old was he when he came to the United States?

31. How many years are there from 1907 to 2000? How many years from 1776 to 1907?

32. A river divides a town of 5500 inhabitants. 2525 inhabitants live on one side of the river. How many live on the other side of the river?

33. In going to school from his home George has to take 3280 steps. After he has taken 1986 steps, how many more steps has he still to take?

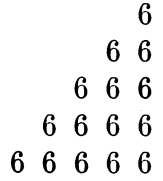
MULTIPLICATION AND DIVISION

ORAL EXERCISES

1. Count by 6's from 0 to 60.

2. Build columns of 6's until you have ten 6's in the last column.

Read these columns thus: one 6 is 6; two 6's are 12; and so on.



3. Read this table of 6's:

$1 \times 6 = 6$	$6 \times 6 = 36$
$2 \times 6 = 12$	$7 \times 6 = 42$
$3 \times 6 = 18$	$8 \times 6 = 48$
$4 \times 6 = 24$	$9 \times 6 = 54$
$5 \times 6 = 30$	$10 \times 6 = 60$

Write this table and learn it by heart.

4. Recite the table, beginning with 6 each time, thus:

$6 \times 1 = 6$	$6 \times 6 = 36$
$6 \times 2 = 12$	$6 \times 7 = 42$
$6 \times 3 = 18$	$6 \times 8 = 48$
$6 \times 4 = 24$	$6 \times 9 = 54$
$6 \times 5 = 30$	$6 \times 10 = 60$

5. Give the products quickly:

$3 \times 6 =$	$2 \times 6 =$	$10 \times 6 =$	$8 \times 6 =$
$6 \times 4 =$	$4 \times 6 =$	$6 \times 2 =$	$6 \times 7 =$
$5 \times 6 =$	$6 \times 6 =$	$7 \times 6 =$	$6 \times 5 =$
$6 \times 8 =$	$9 \times 6 =$	$6 \times 9 =$	$6 \times 3 =$

WRITTEN EXERCISES

1. Write the table of 6's in two ways.

Multiply:

2.	3.	4.	5.	6.	7.	8.	9.
21	31	41	51	61	71	81	91
6	6	6	6	6	6	6	6

10.	11.	12.	13.	14.	15.	16.	17.
201	301	401	501	601	701	801	901
6	6	6	6	6	6	6	6

18.	19.	20.	21.	22.	23.	24.	25.
32	45	83	74	93	72	68	49
6	6	6	6	6	6	6	6

26.	27.	28.	29.	30.	31.	32.	33.
34	48	29	37	75	82	64	73
6	6	6	6	6	6	6	6

ORAL EXERCISES

1. Look at your columns of 6's and answer quickly:

6 is $\frac{1}{2}$ of what number? $\frac{1}{3}$ of what number? $\frac{1}{4}$ of what number? $\frac{1}{5}$ of what number? $\frac{1}{6}$ of what number?

2. Read your columns of 6's, adding 1 to the sum of each column, thus: 7, 13, 19, and so on.

3. Now read it this way: 1×6 and 1 are 7; 2×6 and 1 are 13; and so on.

4. In the same way add 2 to each of the products, thus: 1×6 and 2 are 8; 2×6 and 2 are 14; and so on.

5. Look at your columns of 6's. How many times is 6 contained in 12? in 18? in 24? in 30? in 36? in 42? in 48? in 54? in 60?

6. Read:

$6 \div 6 = 1$	$36 \div 6 = 6$
$12 \div 6 = 2$	$42 \div 6 = 7$
$18 \div 6 = 3$	$48 \div 6 = 8$
$24 \div 6 = 4$	$54 \div 6 = 9$
$30 \div 6 = 5$	$60 \div 6 = 10$

Write this table and learn it by heart.

WRITTEN EXERCISES

1. Show by drawing that $6 \times 2 = 2 \times 6$. How many is $12 \div 6$? How many is $12 \div 2$?

2. Complete this table:

$6 \div \quad = 6$	$36 \div \quad = 6$
$12 \div \quad = 6$	$42 \div \quad = 6$
$18 \div \quad = 6$	$48 \div \quad = 6$
$24 \div \quad = 6$	$54 \div \quad = 6$
$30 \div \quad = 6$	$60 \div \quad = 6$

3. Complete these:

2×6 and $2 =$	1×6 and $5 =$	4×6 and $1 =$
3×6 and $1 =$	9×6 and $3 =$	7×6 and $4 =$
5×6 and $1 =$	8×6 and $2 =$	6×6 and $2 =$

4. Write the answers:

$12 \div 6 =$	$36 \div 6 =$	$18 \div 3 =$	$42 \div 6 =$
$5 \times 6 =$	$9 \times 6 =$	$10 \times 6 =$	$8 \times 6 =$
$24 \div 4 =$	$7 \times 6 =$	$54 \div 6 =$	$30 \div 5 =$
$18 \div 6 =$	$48 \div 6 =$	$6 \times 9 =$	$48 \div 8 =$

5. Write the quotients:

6)126 6)246 6)306 6)426 6)540

6. Divide 252 by 6.

$$\begin{array}{r} 6)252 \\ \underline{42} \end{array}$$

How many times is 6 contained in 25 tens? How many tens are left over? 1 ten + 2 ones = 12 ones. How many times is 6 contained in 12 ones? Check the work.

7. Divide:

6)372 6)438 6)324 6)552 6)270

6)498 6)330 6)444 6)384 6)378

ORAL EXERCISES

1. Count by 7's from 0 to 70.

2. Build columns of 7's until you have ten 7's in the last column and read: one 7 is 7; two 7's are 14; and so on.

NOTE. Each pupil should have a card containing these columns. The tables should also be kept on the blackboard for drill work.

3. Read this table of 7's:

$1 \times 7 = 7$	$6 \times 7 = 42$
$2 \times 7 = 14$	$7 \times 7 = 49$
$3 \times 7 = 21$	$8 \times 7 = 56$
$4 \times 7 = 28$	$9 \times 7 = 63$
$5 \times 7 = 35$	$10 \times 7 = 70$

Write this table and learn it by heart.

4. Recite the table, beginning each time with 7, thus: $7 \times 1 = 7$; $7 \times 2 = 14$; and so on.

5. Begin with the products and read the table this way: $7 = 1 \times 7$ or 7×1; $14 = 2 \times 7$ or 7×2; and so on.

6. Give the answers quickly:

$7 \times 2 =$	$7 \times 6 =$	$2 \times 7 =$	$6 \times 7 =$
$3 \times 7 =$	$7 \times 7 =$	$7 \times 3 =$	$7 \times 9 =$
$7 \times 4 =$	$7 \times 8 =$	$4 \times 7 =$	$8 \times 7 =$
$5 \times 7 =$	$9 \times 7 =$	$7 \times 5 =$	$10 \times 7 =$

WRITTEN EXERCISES

1. Multiply by 7 each of these numbers: 41, 62, 35, 54, 63, 27, 44, 28, 47, 33.

2. Multiply 234 by 7.

234
7
28. What is the product of the ones?
21. What is the product of the tens?
14 What is the product of the hundreds?
1638 What then is the entire product?

3. It is shorter to multiply this way:

7×4 ones are 28 ones. Write the 8 in the ones place, and add the 2 tens to the product of tens. 7×3 tens are 21 tens. 21 tens and 2 tens are 23 tens. Write the 3 in the tens place, and add the 2 hundreds to the product of the hundreds. 7×2 hundreds are 14 hundreds. 14 hundreds and 2 hundreds are 16 hundreds. The product is 1638.

234
7
1638

4. Multiply:

323	432	326	129	338	622
7	7	7	7	7	7

5. Multiply \$3.11 by 7.

$$\begin{array}{r} \$3.11 \\ \times\quad 7 \\ \hline \$21.77 \end{array}$$

In multiplying United States money the period is placed in the product to separate the dollars and cents. The period is placed in the product **directly under the period in the multiplicand.**

6. Multiply:

\$4.20 × 7	\$6.35 × 7	\$2.14 × 7	\$3.72 × 7	\$4.50 × 7
\$1.25 × 7	\$2.70 × 7	\$3.25 × 7	\$3.30 × 7	\$1.15 × 7

7. At \$1.25 a yard, what will 7 yards of cloth cost?

8. A boy earns \$3.25 a week. How much will he earn in 7 weeks?

9. If a ton of coal costs \$8.50, what will 7 tons cost?

ORAL EXERCISES

1. Separate 14 children into 2 equal groups. How many children are there in each group?

2. Look at the columns of 7's that you have built and tell how many times 7 is contained in each of these numbers: 14, 21, 28, 35, 42, 49, 56, 63, 70.

3. Read:

$7 \div 7 = 1$	$42 \div 7 = 6$
$14 \div 7 = 2$	$49 \div 7 = 7$
$21 \div 7 = 3$	$56 \div 7 = 8$
$28 \div 7 = 4$	$63 \div 7 = 9$
$35 \div 7 = 5$	$70 \div 7 = 10$

Write this table and learn it by heart.

4. Complete this table:

$7 \div \quad = 7$	$42 \div \quad = 7$
$14 \div \quad = 7$	$49 \div \quad = 7$
$21 \div \quad = 7$	$56 \div \quad = 7$
$28 \div \quad = 7$	$63 \div \quad = 7$
$35 \div \quad = 7$	$70 \div \quad = 7$

5. Give the answers quickly:

$28 \div 7 =$	$35 \div 7 =$	$14 \div 2 =$	$63 \div 7 =$
$4 \times 7 =$	$42 \div 6 =$	$5 \times 7 =$	$10 \times 7 =$
$21 \div 7 =$	$49 \div 7 =$	$42 \div 7 =$	$7 \times 7 =$
$3 \times 7 =$	$7 \times 8 =$	$7 \times 6 =$	$56 \div 7 =$
7×2 and $1 =$	7×3 and $2 =$	7×4 and $3 =$	
6×7 and $5 =$	7×7 and $4 =$	5×7 and $8 =$	
7×8 and $6 =$	9×7 and $2 =$	8×7 and $5 =$	

WRITTEN EXERCISES

1. Divide by 7 each of these numbers: 21, 35, 49, 14, 56, 63, 28, 42, 70.

2. Find the quotients:

$7\overline{)434}$	$7\overline{)651}$	$7\overline{)525}$	$7\overline{)378}$	$7\overline{)448}$
$7\overline{)574}$	$7\overline{)245}$	$7\overline{)644}$	$7\overline{)294}$	$7\overline{)455}$

3. Find the quotients and the remainders:

$7\overline{)529}$	$7\overline{)394}$	$7\overline{)288}$	$7\overline{)645}$	$7\overline{)573}$
$7\overline{)433}$	$7\overline{)584}$	$7\overline{)824}$	$7\overline{)438}$	$7\overline{)373}$
$7\overline{)488}$	$7\overline{)395}$	$7\overline{)291}$	$7\overline{)865}$	$7\overline{)446}$

4. Divide \$15.61 by 7.

$$7)\$15.61 \quad \$2.23$$

In dividing United States money the period is placed in the quotient to separate the dollars and cents. The period is placed in the quotient **directly under the period in the dividend.**

5. Divide:

7)\$11.34	7)\$9.31	7)\$10.78	7)\$8.89	7)\$7.98
7)\$8.61	7)\$8.26	7)\$9.94	7)\$8.05	7)\$8.96

ORAL EXERCISES

1. An orchard has 8 trees in a row. How many trees are there in 2 rows? in 3 rows? in 4 rows? in 5 rows?

2. Count by 8's from 0 to 80.

3. Build columns of 8's until you have ten 8's in the last column and read: one 8 is 8; two 8's are 16; and so on.

4. Read:

$1 \times 8 = 8$	$6 \times 8 = 48$
$2 \times 8 = 16$	$7 \times 8 = 56$
$3 \times 8 = 24$	$8 \times 8 = 64$
$4 \times 8 = 32$	$9 \times 8 = 72$
$5 \times 8 = 40$	$10 \times 8 = 80$

Write this table and learn it by heart.

5. Read this table, beginning each time with 8, thus: $8 \times 1 = 8$; $8 \times 2 = 16$; and so on. Learn it by heart.

6. Begin with the products and read the table this way: $8 = 8 \times 1$ or 1×8; $16 = 8 \times 2$ or 2×8; and so on.

7. Give the answers quickly:

$8 \times 2 =$	$5 \times 8 =$	$8 \times 6 =$	$8 \times 8 =$
$6 \times 8 =$	$7 \times 8 =$	$3 \times 8 =$	$9 \times 8 =$
$4 \times 8 =$	$8 \times 4 =$	$8 \times 7 =$	$8 \times 9 =$
$8 \times 3 =$	$8 \times 5 =$	$2 \times 8 =$	$10 \times 8 =$

8×2 and $1 =$	5×8 and $2 =$	8×3 and $3 =$
7×8 and $6 =$	8×9 and $7 =$	2×8 and $5 =$
8×8 and $4 =$	6×8 and $9 =$	8×7 and $4 =$
8×4 and $5 =$	8×5 and $4 =$	3×8 and $6 =$

WRITTEN EXERCISES

1. Write the table of 8's in two ways.

2. Multiply by 8 each of these numbers: 45, 36, 27, 49, 52, 28, 34, 47, 65.

Find the products:

3.	4.	5.	6.	7.	8.
232	146	392	426	362	124
8	8	8	8	8	8

9.	10.	11.	12.	13.	14.
235	342	616	324	392	241
8	8	8	8	8	8

15.	16.	17.	18.	19.	20.
\$2.49	\$3.23	\$1.26	\$1.45	\$2.20	\$4.15
8	8	8	8	8	8

21.	22.	23.	24.	25.	26.
\$3.25	\$1.09	\$2.25	\$4.40	\$0.28	\$4.50
8	8	8	8	8	8

ORAL EXERCISES

1. Put 16 roses into 2 vases so that there will be the same number of roses in each vase.

2. If each carriage will hold 8 children, how many carriages will be needed to hold 24 children?

3. From your columns of 8's tell how many times 8 is contained in each of these numbers: 16, 24, 32, 40, 48, 56, 64, 72, 80.

4. Read this table:

$8 \div 8 = 1$	$48 \div 8 = 6$
$16 \div 8 = 2$	$56 \div 8 = 7$
$24 \div 8 = 3$	$64 \div 8 = 8$
$32 \div 8 = 4$	$72 \div 8 = 9$
$40 \div 8 = 5$	$80 \div 8 = 10$

Write this table and learn it by heart.

5. Complete this table:

$8 \div \quad = 8$	$48 \div \quad = 8$
$16 \div \quad = 8$	$56 \div \quad = 8$
$24 \div \quad = 8$	$64 \div \quad = 8$
$32 \div \quad = 8$	$72 \div \quad = 8$
$40 \div \quad = 8$	$80 \div \quad = 8$

6. Give the answers quickly:

$16 \div 2 =$	$24 \div 8 =$	$56 \div 7 =$	$80 \div 10 =$
$8 \times 3 =$	$8 \times 5 =$	$72 \div 8 =$	$64 \div 8 =$
$24 \div 3 =$	$4 \times 8 =$	$80 \div 8 =$	$72 \div 9 =$
$32 \div 8 =$	$40 \div 5 =$	$56 \div 8 =$	$32 \div 4 =$
$16 \div 8 =$	$48 \div 8 =$	$48 \div 6 =$	$40 \div 8 =$

WRITTEN EXERCISES

Find the quotients:

1.	2.	3.	4.	5.
8)264	8)456	8)752	8)976	8)584
6.	**7.**	**8.**	**9.**	**10.**
8)680	8)368	8)272	8)896	8)464
11.	**12.**	**13.**	**14.**	**15.**
8)$10.72	8)$9.68	8)$12.40	8)$9.84	8)$10.16
16.	**17.**	**18.**	**19.**	**20.**
8)$9.92	8)$9.04	8)$13.04	8)$9.60	8)$7.68

21. Divide 856 by 8.

8 is contained in 85 tens, 10 times with the remainder 5 tens. 5 tens and 6 ones, or 56, contain 8, 7 times.

8)856
107

In dividing we say: 8 in 8, once, and write 1 under the 8; 8 in 5, no times, and write 0 under the 5; 8 in 56, 7 times, and write the 7 under the 6.

Do not forget to write the 0 in these quotients.

22.	23.	24.	25.	26.
8)848	8)824	8)816	8)832	8)840
27.	**28.**	**29.**	**30.**	**31.**
7)749	7)735	7)728	7)763	7)721
32.	**33.**	**34.**	**35.**	**36.**
6)618	6)636	6)624	6)654	6)648

ORAL EXERCISES

1. Count by 9's from 0 to 90.

2. In the corner of a field James planted some popcorn. He had room for 9 hills in each row. When he had planted 2 rows, how many hills had he planted? When he had planted 3 rows, how many hills had he planted?

3. Build columns of 9's until you have ten 9's in the last column. Read them and make this table:

$1 \times 9 = 9$	$6 \times 9 = 54$
$2 \times 9 = 18$	$7 \times 9 = 63$
$3 \times 9 = 27$	$8 \times 9 = 72$
$4 \times 9 = 36$	$9 \times 9 = 81$
$5 \times 9 = 45$	$10 \times 9 = 90$

Write this table and learn it by heart.

4. Read this table, beginning each time with 9, thus: $9 \times 1 = 9$; $9 \times 2 = 18$; and so on.

5. Begin with the products and read the table this way: $9 = 1 \times 9$ or 9×1; $18 = 2 \times 9$ or 9×2; and so on.

6. Give the answers quickly:

$2 \times 9 =$	$3 \times 9 =$	$4 \times 9 =$	$5 \times 9 =$
$9 \times 3 =$	$9 \times 4 =$	$9 \times 5 =$	$9 \times 6 =$
$6 \times 9 =$	$7 \times 9 =$	$8 \times 9 =$	$9 \times 9 =$
$9 \times 7 =$	$9 \times 8 =$	$9 \times 1 =$	$10 \times 9 =$

4×9 and $3 =$	8×9 and $5 =$	3×9 and $2 =$
9×5 and $6 =$	9×2 and $3 =$	9×6 and $5 =$
7×9 and $2 =$	5×9 and $8 =$	9×4 and $7 =$
9×3 and $8 =$	9×7 and $7 =$	9×8 and $6 =$

WRITTEN EXERCISES

1. Write the table of 9's in two ways.

2. Multiply by 9 each of these numbers: 26, 34, 42, 53, 29, 87, 46, 65, 73.

Find the products:

3.	4.	5.	6.	7.
235 × 9	496 × 9	372 × 9	695 × 9	892 × 9
8.	**9.**	**10.**	**11.**	**12.**
723 × 9	423 × 9	526 × 9	344 × 9	532 × 9
13.	**14.**	**15.**	**16.**	**17.**
\$4.25 × 9	\$3.98 × 9	\$6.24 × 9	\$9.32 × 9	\$7.35 × 9
18.	**19.**	**20.**	**21.**	**22.**
\$3.05 × 9	\$4.30 × 9	\$6.60 × 9	\$9.00 × 9	\$8.35 × 9

23. What will 9 chairs cost at \$8.50 apiece?

24. A boy earns \$7.50 a week. How much does he earn in 9 weeks?

25. There are 320 rods in a mile. How many rods are there in 9 miles?

26. There are 231 cubic inches in a gallon. How many cubic inches are there in 9 gallons?

27. Frank bought 9 pigs and paid \$3.75 for each pig. How much did he pay in all?

ORAL EXERCISES

1. Look at your columns of 9's and tell how many times 9 is contained in each of the following numbers: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90.

2. Read this table:

$9 \div 9 = 1$	$54 \div 9 = 6$
$18 \div 9 = 2$	$63 \div 9 = 7$
$27 \div 9 = 3$	$72 \div 9 = 8$
$36 \div 9 = 4$	$81 \div 9 = 9$
$45 \div 9 = 5$	$90 \div 9 = 10$

Write this table and learn it by heart.

3. Complete this table:

$9 \div \quad = 9$	$54 \div \quad = 9$
$18 \div \quad = 9$	$63 \div \quad = 9$
$27 \div \quad = 9$	$72 \div \quad = 9$
$36 \div \quad = 9$	$81 \div \quad = 9$
$45 \div \quad = 9$	$90 \div \quad = 9$

WRITTEN EXERCISES

Find the quotients and check your work:

1.	2.	3.	4.	5.
9)828	9)747	9)666	9)567	9)378
6.	**7.**	**8.**	**9.**	**10.**
9)999	9)477	9)288	9)837	9)738
11.	**12.**	**13.**	**14.**	**15.**
9)$11.25	9)$10.44	9)$10.62	9)$9.63	9)$9.81

16.	17.	18.	19.	20.
9)$10.89	9)$14.58	9)$10.08	9)$12.15	9)$9.27

Find the quotients and the remainders:

21.	22.	23.	24.	25.
9)493	9)676	9)739	9)668	9)379
26.	**27.**	**28.**	**29.**	**30.**
9)291	9)840	9)750	9)375	9)472
31.	**32.**	**33.**	**34.**	**35.**
9)871	9)615	9)457	9)555	9)345
36.	**37.**	**38.**	**39.**	**40.**
9)537	9)512	9)246	9)732	9)689

41. If I divide $11.25 equally among 9 boys, how much will each boy receive?

42. What is $\frac{1}{9}$ of $9.72?

43. $\frac{1}{9}$ of 207 ft. is how many feet?

44. $\frac{1}{9}$ of 369 in. is how many inches?

45. At $9 for each calf, how many calves can Tom buy with $216?

ORAL EXERCISES

1. Count by 10's from 0 to 100.

2. Build columns of 10's until you have ten 10's in the last column.

3. To the sum of each column add 1 and read in this way: 1 times 10 and 1 are 11; 2 times 10 and 1 are 21; and so on.

4. Read this table:

$1 \times 10 = 10$	$6 \times 10 = 60$
$2 \times 10 = 20$	$7 \times 10 = 70$
$3 \times 10 = 30$	$8 \times 10 = 80$
$4 \times 10 = 40$	$9 \times 10 = 90$
$5 \times 10 = 50$	$10 \times 10 = 100$

5. Repeat it, beginning each time with the product:

$10 \div 10 = 1$	$60 \div 10 = 6$
$20 \div 10 = 2$	$70 \div 10 = 7$
$30 \div 10 = 3$	$80 \div 10 = 8$
$40 \div 10 = 4$	$90 \div 10 = 9$
$50 \div 10 = 5$	$100 \div 10 = 10$

6. Repeat the division table of tens this way: 1 in 10, 10 times; 2 in 20, 10 times; and so on.

7. 10 times 2 and 1 are how many? Complete the table, adding 1 to each product: 10×2 and 1 are 21; 10×3 and 1 are 31; and so on.

8. In the same way complete the table, adding to each product 2; 3; 4; 5; 6; 7; 8; 9.

9. Divide by 10 each of these numbers: 60, 70, 80, 90, 120, 140, 150.

WRITTEN EXERCISES

Find the quotients:

1.	2.	3.	4.	5.
$10\overline{)450}$	$10\overline{)690}$	$10\overline{)840}$	$10\overline{)730}$	$10\overline{)950}$
6.	**7.**	**8.**	**9.**	**10.**
$10\overline{)670}$	$10\overline{)890}$	$10\overline{)470}$	$10\overline{)390}$	$10\overline{)490}$

Find the quotients and the remainders:

11.	12.	13.	14.	15.
10)392	10)456	10)723	10)932	10)548
16.	**17.**	**18.**	**19.**	**20.**
10)824	10)973	10)893	10)736	10)934

21. What is $\frac{1}{10}$ of \$450?

22. Martha paid \$6.40 for 10 yards of flannel. How much did one yard cost?

REVIEW EXERCISES

1. Read the products at sight:

21	33	19	14	14	50	18	12	13
4	2	6	7	4	3	8	9	6
22	35	17	13	21	22	16	14	12
4	3	7	5	6	3	5	8	8

2. Give the quotients at sight:

7)35	8)48	9)72	3)36	9)54	7)14
3)30	10)50	7)21	4)48	5)35	8)64
4)28	9)45	6)42	6)54	2)24	9)27

3. Give the quotients and the remainders quickly:

9)20	5)47	6)49	4)35	2)17	3)25
7)51	8)19	5)57	7)45	9)21	3)32
10)41	9)38	6)25	8)65	6)28	7)29

4. How many gallons are there in 48 quarts?

5. How many pieces of 10 yards each can be cut from a piece of cloth that measures 120 yards?

6. What did Carl pay for 7 qt. of cherries at 10 ct. a quart? What change had he left out of 75 ct.?

7. How many school days are there in 6 weeks? William was absent $\frac{1}{10}$ of the time. How many days was he present at school?

8. What is the perimeter of a 9-inch square? of a 7-inch square?

9. What is the area of an oblong 9 inches long and 7 inches wide?

10. George had a kite string 48 ft. long. He tied on a piece $\frac{1}{2}$ as long. How long was the kite string then?

11. At 10 ct. a dozen, what will 36 bananas cost?

12. Lottie's age is 9 years and her grandmother's age is 8 times as many years. How old is her grandmother?

REVIEW EXERCISES

Find the products:

1.	2.	3.	4.	5.	6.
234 × 5	346 × 6	144 × 7	233 × 8	394 × 9	423 × 7
7.	**8.**	**9.**	**10.**	**11.**	**12.**
221 × 8	436 × 9	612 × 5	214 × 6	426 × 7	392 × 8
13.	**14.**	**15.**	**16.**	**17.**	**18.**
454 × 9	238 × 8	225 × 9	148 × 7	365 × 6	592 × 7

19.	20.	21.	22.	23.	24.
\$7.38	\$8.21	\$4.05	\$2.40	\$6.26	\$9.45
8	9	6	8	7	8

25.	26.	27.	28.	29.	30.
\$3.38	\$5.92	\$6.40	\$8.20	\$7.29	\$8.63
6	8	6	8	9	7

Find the quotients:

31.	32.	33.	34.	35.
3)366	8)168	7)217	9)369	7)497

36.	37.	38.	39.	40.
5)205	8)488	9)279	8)328	9)549

41.	42.	43.	44.	45.
7)\$9.17	6)\$7.14	9)\$9.90	8)\$9.92	7)\$8.54

Find the quotients and the remainders:

46.	47.	48.	49.	50.
5)364	8)426	7)824	8)638	6)509

51.	52.	53.	54.	55.
9)469	6)394	5)731	7)298	8)602

56.	57.	58.	59.	60.
6)496	5)483	7)829	8)652	5)594

61.	62.	63.	64.	65.
6)673	7)926	9)575	6)995	8)633

WRITTEN EXERCISES

1. There are seven days in one week. How many days are there in 52 weeks?

2. One box holds 150 oranges. How many oranges are there in 9 boxes?

3. A clock strikes 624 times in 4 days. How many times does it strike in one day?

4. Edna had 85 cents to spend for lace at 9 ct. a yard. How many yards did she buy? How many cents had she left?

5. If an acre of land is worth $75, what are 7 acres of land worth?

6. There are 144 pens in a box. How many pens are there in 3 boxes?

7. What is the cost of 5 bicycles at $45 apiece?

8. There are 36 school weeks in a school year, and 5 school days in each week. How many days are there in a school year?

9. Nellie bought a present for her mother and spent one third of all the money she had saved. The present cost $2.25. How much money had she saved?

10. How many gallons of maple sirup will fill 376 quart jars?

11. Walter bought three books at $1.75 apiece. How much did he pay for them?

12. If an overcoat costs $5.25, what will 5 overcoats cost?

13. If a boy earns $7.20 in 6 days, how much does he earn in one day?

14. A gardener hired 7 children to pick strawberries. He paid each \$3.25 a week. How much did they all earn in one week?

15. A man buys a pair of skates for each of his four boys. At \$1.75 a pair, what do the skates cost him?

16. What is $\frac{1}{6}$ of $3 \times \$20$?

FRACTIONS

ORAL EXERCISES

1. Write these columns on the board and give the sums:

6	5	7	4
6	5	7	4
6	5	7	4
6	5	7	4

2. What is $\frac{1}{2}$ of 24? $\frac{1}{2}$ of 20? $\frac{1}{2}$ of 28? $\frac{1}{2}$ of 16?

3. What is $\frac{1}{4}$ of 24? $\frac{1}{4}$ of 20? $\frac{1}{4}$ of 28? $\frac{1}{4}$ of 16?

4. What is $\frac{3}{4}$ of 24? $\frac{3}{4}$ of 20? $\frac{3}{4}$ of 28? $\frac{3}{4}$ of 16?

5. At 24 ct. a pound, what will $\frac{1}{4}$ of a pound of butter cost? What will $\frac{1}{4}$ of a pound cost at 28 ct. a pound?

6. At 16 ct. a dozen, what will $\frac{3}{4}$ of a dozen of eggs cost?

7. Mary bought $\frac{3}{4}$ of a yard of ribbon at 20 ct. a yard. What did it cost?

8. There are 16 ounces in a pound. How many ounces are there in $\frac{3}{4}$ of a pound?

9. $\frac{1}{2}$ of 20 marbles and $\frac{1}{2}$ of 24 marbles are how many marbles?

10. James had 20 ct. and spent $\frac{1}{4}$ of his money for a ball. How many cents had he left?

WRITTEN EXERCISES

1.	2.	3.
$\frac{1}{4}$ of 24 = ?	$\frac{1}{2}$ of 24 = ?	$\frac{3}{4}$ of 24 = ?
$\frac{1}{4}$ of 28 = ?	$\frac{1}{2}$ of 28 = ?	$\frac{3}{4}$ of 28 = ?
$\frac{1}{4}$ of 20 = ?	$\frac{1}{2}$ of 20 = ?	$\frac{3}{4}$ of 20 = ?
$\frac{1}{4}$ of 16 = ?	$\frac{1}{2}$ of 16 = ?	$\frac{3}{4}$ of 16 = ?

4. *1 pound = 16 ounces.* How many ounces in $\frac{1}{4}$ pound? in $\frac{1}{2}$ pound? in $\frac{3}{4}$ pound?

ORAL EXERCISES

1. Point to these columns and give the sum of each. What is $\frac{1}{2}$ of 16? $\frac{1}{4}$ of 32? $\frac{3}{4}$ of 32? $\frac{1}{2}$ of 48? $\frac{2}{3}$ of 24? $\frac{1}{5}$ of 40? $\frac{2}{5}$ of 40?

2. Robert had 40 ct. He spent $\frac{3}{5}$ of his money for a book. How many cents did he spend?

3. Ruth weighs 48 pounds and her little brother weighs $\frac{1}{2}$ as much. How much does he weigh?

4. What will $\frac{2}{3}$ of a yard of ribbon cost at 24 ct. a yard?

5. Find the cost of a pound of butter at 32 ct. a pound.

6. $\frac{1}{4}$ of 32 is the same as what part of 40?

					8								8
				8	8						8	8	8
			8	8	8				8	8	8	8	8
		8	8	8	8			8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8	8	8	8	8

WRITTEN EXERCISES

1.

					6								7
				6	6						7	7	7
			6	6	6					7	7	7	7
		6	6	6	6				7	7	7	7	7
	6	6	6	6	6			7	7	7	7	7	7
6	6	6	6	6	6		7	7	7	7	7	7	7
6	12	18	24	30	36		7	14	21	28	35	42	

2. Look at the columns and complete these statements:

$\frac{1}{2}$ of 12 =	$\frac{4}{5}$ of 35 =
$\frac{2}{3}$ of 18 =	$\frac{1}{2}$ of 42 =
$\frac{3}{4}$ of 24 =	$\frac{1}{2}$ of 28 =
$\frac{3}{5}$ of 30 =	$\frac{3}{4}$ of 28 =
$\frac{5}{6}$ of 36 =	$\frac{4}{5}$ of 35 =

REVIEW EXERCISES

1. How many are $\frac{1}{2}$ of a dozen? $\frac{1}{3}$ of a dozen? $\frac{2}{3}$ of a dozen? $\frac{1}{4}$ of a dozen? $\frac{3}{4}$ of a dozen? $\frac{1}{6}$ of a dozen? $\frac{5}{6}$ of a dozen? $\frac{1}{12}$ of a dozen? $\frac{5}{12}$ of a dozen? $\frac{7}{12}$ of a dozen?

2. How many inches in 1 yard? in $\frac{1}{3}$ yd.? in $\frac{1}{6}$ yd.? in $\frac{5}{6}$ yd.? in $\frac{1}{4}$ yd.? in $\frac{3}{4}$ yd.? in $\frac{1}{9}$ yd.? in $\frac{4}{9}$ yd.?

3. How many quarts in 1 gallon? in $\frac{1}{4}$ gallon? in $\frac{1}{2}$ gallon? in $\frac{3}{4}$ gallon?

4. How many minutes in 1 hour? in $\frac{1}{2}$ hr.? in $\frac{1}{4}$ hr.? in $\frac{3}{4}$ hr.? in $\frac{1}{3}$ hr.? in $\frac{2}{3}$ hr.?

5. How many cents in \$1? in $\$\frac{1}{2}$? in $\$\frac{1}{4}$? in $\$\frac{3}{4}$?

6. How many ounces in 1 pound? in $\frac{1}{2}$ of a pound? in $\frac{1}{4}$ of a pound? in $\frac{3}{4}$ of a pound?

WRITTEN EXERCISES

1. Write five numbers that equal $\frac{1}{4}$ of other numbers, thus: $4 = \frac{1}{4}$ of 16; $8 = \frac{1}{4}$ of 32; and so on.

2. Write five numbers that equal $\frac{3}{4}$ of other numbers.

3. Write five numbers that equal $\frac{1}{5}$ of other numbers.

4. Write five numbers that equal $\frac{2}{5}$ of other numbers.

5. Write five numbers that equal $\frac{1}{3}$ of other numbers.

6. Write five numbers that equal $\frac{2}{3}$ of other numbers.

PARTS OF OBJECTS

ORAL EXERCISES

1. How many halves are there in 1? in $1\frac{1}{2}$? in 2? in $2\frac{1}{2}$? in 3? in $3\frac{1}{2}$?

2. Tell the number of halves in each of the following: 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, 6, $6\frac{1}{2}$.

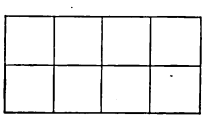
3. How many dollars are equal to $\$\frac{4}{2}$? $\$\frac{5}{2}$? $\$\frac{6}{2}$? $\$\frac{7}{2}$?

4. How many thirds are there in 1? How many in 2? in $2\frac{1}{3}$? in $2\frac{2}{3}$? in 3?

5. How many fourths are there in 1? in $1\frac{1}{4}$? in $1\frac{3}{4}$? in 2? in $2\frac{1}{4}$?

6. $\frac{1}{3}$ is how many sixths? $\frac{1}{2}$ is how many sixths?

7. Look at the oblong. Show $\frac{1}{2}$ of it; $\frac{1}{4}$ of it; $\frac{1}{8}$ of it. $\frac{1}{2}$ = how many fourths? $\frac{1}{2}+\frac{1}{4}$ = how many fourths? $\frac{1}{2}$ = how many eighths?



8. $1-\frac{1}{6}$ is how many sixths? $1-\frac{1}{8}$ is how many eighths?

9. $1-\frac{3}{8}$ is how many eighths? $1-\frac{5}{8}$ is how many eighths?

DRAWING EXERCISES

1. Draw lines 3 inches long and divide them to show that $\frac{1}{2}=\frac{3}{6}$; $\frac{1}{3}=\frac{2}{6}$; $\frac{2}{3}=\frac{4}{6}$.

2. Draw oblongs 4 inches long and 2 inches wide, and divide them to show that $\frac{1}{2}=\frac{2}{4}$; $\frac{1}{2}=\frac{4}{8}$; $\frac{1}{4}=\frac{2}{8}$; $\frac{3}{4}=\frac{6}{8}$.

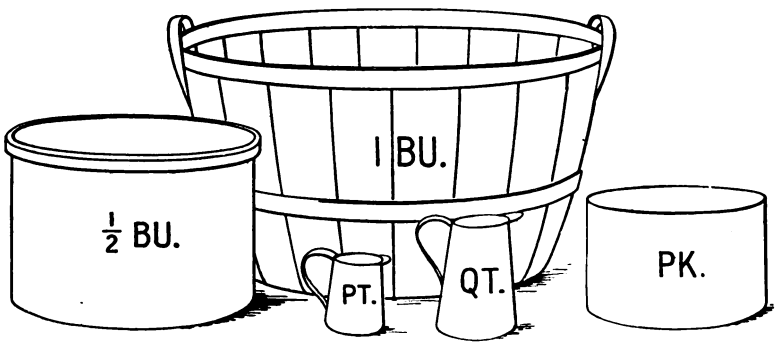
3. Draw oblongs 4 inches long and 1 inch wide, and shade them to show that $1-\frac{1}{4}=\frac{3}{4}$; $1-\frac{3}{4}=\frac{1}{4}$; $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{3}{4}$.

4. Draw lines 4 inches long and divide them to show that $1-\frac{1}{8}=\frac{7}{8}$; $\frac{1}{4}+\frac{1}{8}=\frac{3}{8}$; $\frac{1}{2}+\frac{1}{8}=\frac{5}{8}$.

MEASURES

ORAL EXERCISES

1. Look at the measures in the picture. Where have you seen measures like these used? Name some things that are sold by the peck or by the bushel.



2. What measures are used in selling oil? in selling milk? in selling vinegar? in selling molasses? Why do we call the measures used for these things liquid measures?

3. What measures are used in selling oats? in selling wheat? in selling potatoes? in selling apples? in selling peaches? Why do we call these measures dry measures?

4. If we fill the quart measure with grain or sand and empty it into the peck measure eight times, we will fill the peck measure. The peck measure is 8 times as large as the quart measure. How many quarts make a peck?

5. The peck measure must be filled and emptied 4 times to fill the bushel measure. A bushel is 4 times as large as a peck. How many pecks in a bushel?

6. What part of a bushel are 2 pecks? 1 peck? 3 pecks?

7. How many pints in a quart? A pint is what part of a quart?

8. We now know the following

TABLE

2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel

9. For short we write **pt.** for pint or pints; **qt.** for quart or quarts; **pk.** for peck or pecks; **bu.** for bushel or bushels.

WRITTEN EXERCISES

1. 2 qt. + 3 qt. + 5 qt. + 6 qt. are how many quarts? how many pecks? how many pints?

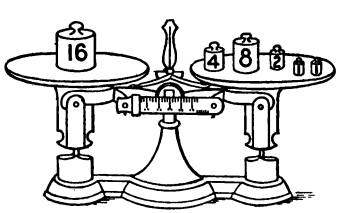
2. How many quarts in 2 pk.? in 3 pk.?

3. Jennie picked 64 qt. of plums. How many pecks did she pick? How many bushels?

4. A barrel holds 11 pecks of apples. How many bushels does it hold?

ORAL EXERCISES

1. The largest weight is called a pound. If you put a pound weight on one side of the scales, you must put 16 ounce weights on the other side to balance it. The pound weight is how many times as heavy as the ounce weight?



2. How many ounces make a pound? What part of a pound is 8 ounces? What part is 4 ounces?

3. At 30 ct. a pound, what will $\frac{1}{2}$ of a pound of butter cost?

4. 4 ounces of tea are what part of a pound? 12 ounces are what part of a pound?

5. We now know the following

TABLE

16 ounces = 1 pound

6. For short we write **oz.** for ounce or ounces, and **lb.** for pound or pounds.

WRITTEN EXERCISES

1. 5 lb. + 8 lb. = how many pounds?
2. 24 lb. − 18 lb. = how many pounds?
3. 8 oz. + 8 oz. + 4 oz. = how many ounces?
4. 20 oz. = how many pounds?
5. $2\frac{1}{2}$ lb. + 8 oz. = how many pounds?
6. $\frac{1}{2}$ lb. − 4 oz. = how many ounces?

ORAL EXERCISES

1. How many tens are there in one hundred? How many dimes equal a dollar? How many half dollars? How many quarter dollars?

2. How many nickels equal a dime? How many nickels equal a dollar? How many cents equal a dollar?

3. What part of a dollar is 50 ct.? is 25 ct.? is 75 ct.?

4. $\$\frac{1}{2}$ = how many dimes? How many nickels?

5. If I spend $\$\frac{1}{4}$, how many cents do I spend? $\$\frac{1}{4}$ = what part of $\$\frac{1}{2}$? 25 ct. = what part of 50 ct.?

6. How many cents are there in \$2? in $\$2\frac{1}{2}$? in $\$3\frac{1}{4}$?

7. How many cents in \$1 and 3 dimes? in \$1 and 3 nickels? in \$1 and 7 ct.?

MEASURING

ORAL EXERCISES

1. Measure the length and the width of your desk. The top contains how many square inches?

2. Measure the length and the width of your arithmetic. Each page contains how many square inches?

3. Measure the length and the width of your reader. What is the area of each page? What is the perimeter?

4. Draw a 2-inch square. Draw a 4-inch square. The 2-inch square equals what part of the 4-inch square? Give the area and the perimeter of the 2-inch square; of the 4-inch square.

WRITTEN EXERCISES

1. Draw an oblong 4 inches long and 2 inches wide. Find the area and the perimeter.

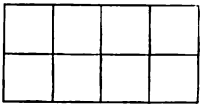
2. Draw an oblong one half as long and one half as wide as the first oblong. Find the area and the perimeter.

3. Find the area and the perimeter of an oblong 9 ft. long and 6 ft. wide.

4. A square 5 yd. long contains how many square yards? How many yards long is its perimeter?

ORAL EXERCISES

1. This is the picture of an oblong 4 ft. long and 2 ft. wide. Each foot in its length and width is represented by $\frac{1}{4}$ in. The oblong has been drawn to a scale of $\frac{1}{4}$ in. to 1 ft.



2. Think of a square 3 yd. long. Draw a picture of this square to the scale of $\frac{1}{2}$ in. to 1 yd.

3. Draw a plan of a room 20 ft. long and 18 ft. wide to a scale of $\frac{1}{4}$ in. to 1 ft.; a plan of a garden 20 ft. long and 16 ft. wide to a scale of $\frac{1}{2}$ in. to 1 ft.; a plan of a lot 80 ft. long and 60 ft. wide to a scale of $\frac{1}{2}$ in. to 10 ft.

4. Draw an oblong 6 in. long and 3 in. wide. Divide it into square inches. How many square inches in one row? How many rows? The area is how many square inches?

5. Draw a square foot. How many inches long is it? Divide it into square inches. How many square inches in one row? How many rows of 12 square inches? 12×12 square inches are how many square inches? A square foot is how many square inches?

6. Draw a square yard to the scale of 1 in. to 1 ft. How many square feet does it contain?

7. We now know the following

TABLE

144 square inches = 1 square foot
9 square feet = 1 square yard

8. For short we write **sq. in.** for square inch or square inches; **sq. ft.** for square foot or square feet; and **sq. yd.** for square yard or square yards.

WRITTEN EXERCISES

Draw to a scale of $\frac{1}{4}$ inch to 1 foot. Find the areas and the perimeters of:

1. An oblong 16 ft. long and 12 ft. wide.
2. A square 8 yd. on a side.
3. The floor plan of a schoolroom that is 40 ft. long and 30 ft. wide.
4. The plan of a flower bed 36 ft. long and 16 ft. wide.

ORAL EXERCISES

1. How many square feet in 2 sq. yd.? How many square yards in 9 sq. ft.? in 27 sq. ft.?
2. 2 bu. and 1 pk. are how many pecks?
3. How many quarts in 1 pk.? in $2\frac{1}{2}$ pk.?
4. How many hours in one day? in $\frac{1}{2}$ da.? in $\frac{1}{4}$ da.?
5. How many minutes in one hour? 30 min. is what part of 1 hr.? 15 min. is what part of 1 hr.? 45 min. is what part of 1 hr.?
6. How many inches in 2 ft. 6 in.? in 3 ft.? in 1 yd.?
7. How many square inches in 2 sq. ft.?
8. What will a gallon of oil cost at 5 ct. a quart?
9. What is the sum of a dollar, a half dollar, a dime, and a nickel?
10. At a dollar a bushel, what will a peck of apples cost?
11. What will 6 oranges cost at 30 ct. a dozen?
12. What will 9 eggs cost at 32 ct. a dozen?
13. John has a dollar. If he buys three tickets for a ball game at 25 ct. each, how much money will he have left?

WRITTEN EXERCISES

1. Write these numbers in figures: five thousand fifty-five; eighteen hundred fifty-eight; seven thousand three hundred forty-six; nineteen hundred fourteen.

2. The rents for an office building for one month were as follows: first floor, $384; second floor, $290; third floor, $275; fourth floor, $186. What was the total rent for the month?

3. Four coal trains left the mines loaded as follows: the first contained 1100 tons of coal; the second, 1275 tons; the third, 998 tons; the fourth, 1822 tons. How many tons of coal did the four trains carry?

4. A merchant's receipts for one day were: currency, $298.85; checks, $624.88; two drafts of $150.00 each. What were the total receipts?

5. A town has to-day 8967 inhabitants. It gained 1289 in ten years. What was the population ten years ago?

6. An excursion train made four stops on its return trip. At the first station 89 passengers got off; at the second, 78; at the third, 122; at the fourth, 55. How many passengers remained on the train if there were 500 on it when it started?

7. By one way it is 411 miles from New York to Buffalo and 541 miles from Buffalo to Chicago. How far is it from New York to Chicago?

8. A retail merchant offered a wholesale merchant $8 apiece for 96 suits of clothes. The wholesale merchant asked $9 apiece for them. If the wholesale merchant accepts the offer, how many dollars in all did he throw off?

9. A farmer was offered 6 cents a pound for 20 hogs weighing together 4896 pounds. He kept them a week, during which time they gained 58 pounds, and he then sold them for 7 cents a pound. How much did he gain by keeping them?

10. If it costs on an average $129 to run a locomotive between two points, how much will it cost for nine trips?

11. A teacher receives $45 per month for nine months. How much does she receive in all?

12. A mile contains 5280 feet. How many feet in one eighth of a mile?

13. If milk costs 7 cents a quart and a family uses 2 quarts a day, how much will be the milk bill for 7 days?

14. A man paid $487 for a lot. He built on it a house costing $2225 and a barn costing $250. What was the total cost?

15. Ralph receives $55 a month for 7 months, and George $45 a month for 9 months. How much more does George receive than Ralph?

16. What is the cost of 216 calves at $9 per head?

17. A farmer paid $329 for 7 cows. How much did he pay for each cow?

18. What is the cost of 564 tons of coal at $6 per ton?

19. Frank pays a debt amounting to $26.17, and gave in payment 3 ten-dollar bills. How much change should he receive?

20. What is the cost of 9 desks at $8.80 each?

21. A bushel of oats weighs 32 pounds. How many pounds do 8 bushels of oats weigh?

WRITTEN EXERCISES

Add:

1.	2.	3.	4.	5.
$5.43	$9.34	$8.27	$11.17	$13.37
1.27	2.18	9.36	25.25	72.26
3.19	6.25	10.19	37.37	87.19

6.	7.	8.	9.	10.
$2.03	$8.12	$12.12	$14.05	$30.03
3.04	7.32	13.13	11.10	20.02
3.21	5.13	21.21	31.32	40.01
5.51	6.41	32.32	23.50	50.50
6.18	7.56	18.72	15.68	19.87

11.	12.	13.	14.	15.
$4.06	$5.17	$13.78	$16.27	$15.76
2.98	6.24	14.26	18.42	8.24
3.74	8.19	19.16	27.96	24.16
2.45	3.32	12.04	11.34	14.26
6.17	4.46	18.75	12.19	18.91
9.63	8.75	22.67	19.84	22.68

16.	17.	18.	19.	20.
$6.17	$2.99	$9.99	$10.06	$1.98
2.98	1.86	1.06	9.80	10.47
1.48	3.47	22.14	4.29	8.93
3.65	8.21	13.87	13.62	26.12
2.91	1.69	20.16	8.75	10.89
1.64	5.16	7.98	22.10	37.16
7.49	8.22	10.00	41.09	9.48
8.73	9.87	5.46	52.49	6.52

Subtract:

21.	22.	23.	24.	25.
\$7.45	\$7.89	\$8.59	\$9.33	\$36.55
5.03	4.63	5.26	7.29	28.00

26.	27.	28.	29.	30.
\$9.51	\$5.65	\$6.41	\$6.73	\$17.44
3.28	1.27	2.38	1.09	8.36

31.	32.	33.	34.	35.
\$8.63	\$7.11	\$9.16	\$8.92	\$24.31
2.99	4.09	2.38	3.19	15.42

36.	37.	38.	39.	40.
\$9.17	\$8.45	\$6.07	\$9.36	\$46.18
6.29	4.56	3.08	4.07	20.09

Multiply:

41.	42.	43.	44.	45.
\$1.13	\$2.24	\$5.10	\$8.12	\$9.08
3	4	5	6	7

46.	47.	48.	49.	50.
\$11.07	\$10.09	\$9.07	\$7.09	\$6.08
8	9	9	7	8

51.	52.	53.	54.	55.
\$17.05	\$11.28	\$8.12	\$6.99	\$14.03
4	8	9	5	6

56.	57.	58.	59.	60.
\$10.86	\$12.08	\$9.33	\$8.72	\$10.44
9	4	7	8	9

61.	62.	63.	64.	65.
\$15.80	\$10.94	\$8.65	\$7.83	\$11.22
6	7	9	6	8

66. Divide by 2 each of these numbers:

468	456	372	331	634	972
326	253	214	547	418	905

67. Divide by 3 each of these numbers:

354	365	624	484	408	798
444	235	651	790	891	976

68. Divide by 4 each of these numbers:

924	824	955	564	592	918
752	912	734	723	961	513

69. Divide by 5 each of these numbers:

510	520	644	770	590	742
665	735	560	887	623	825

70. Divide by 6 each of these numbers:

666	636	732	727	822	924
624	725	746	810	845	933

71. Divide by 7 each of these numbers:

728	785	812	861	910	943
745	797	805	873	935	950

72. Divide by 8 each of these numbers:

808	835	911	335	416	258
816	843	920	350	428	264

73. Divide by 9 each of these numbers:

927	943	405	377	288	137
936	915	391	388	295	223

Add:

74.	**75.**	**76.**	**77.**	**78.**	**79.**
296	655	199	658	395	784
414	856	255	397	998	993
856	749	346	456	627	635
545	555	438	538	456	566

80.	**81.**	**82.**	**83.**	**84.**	**85.**
499	496	544	299	655	852
326	338	647	437	247	498
262	293	765	657	933	757
844	158	854	669	247	569
978	956	989	582	696	374
985	849	158	471	968	686

86.	**87.**	**88.**	**89.**	**90.**	**91.**
492	387	485	528	367	538
568	756	968	665	459	465
279	492	253	789	438	847
648	567	412	998	862	365
375	784	966	437	219	318
594	955	757	569	483	476

Subtract:

92. 9530 – 4878.
93. 4878 – 897.
94. 8676 – 7878.
95. 9644 – 1888.
96. 9595 – 5468.
97. 7677 – 6878.
98. 9004 – 4768.
99. 8002 – 7834.
100. 4320 – 1667.
101. 6543 – 4757.
102. 7654 – 5667.
103. 8065 – 6776.
104. 8345 – 4677.
105. 9640 – 6777.
106. 6653 – 3767.
107. 9412 – 7777.
108. 9586 – 5767.
109. 8001 – 4006.
110. 6076 – 2179.
111. 9604 – 5075.
112. 6243 – 4767.
113. 9456 – 7537.
114. 7653 – 2767.
115. 9114 – 7116.
116. 6000 – 1367.
117. 9011 – 8927.

Multiply:

118.	119.	120.	121.	122.
384	426	819	427	459
3	4	5	6	7

123.	124.	125.	126.	127.
286	375	492	861	478
4	5	8	9	6

128.	129.	130.	131.	132.
715	619	453	209	607
7	8	9	8	7

133.	134.	135.	136.	137.
528	437	922	817	568
6	8	6	4	7

Divide:

138. $16.08 by 2.
139. $12.24 by 2.
140. $18.36 by 3.
141. $24.12 by 4.
142. $25.05 by 5.
143. $12.24 by 6.
144. $24.12 by 6.
145. $35.35 by 7.
146. $49.42 by 7.
147. $56.56 by 7.
148. $56.56 by 8.
149. $64.08 by 8.
150. $54.54 by 9.
151. $81.09 by 9.
152. $63.72 by 9.

Divide:

153. 9)3519	**154.** 5)3325	**155.** 7)3486	**156.** 4)5316
157. 6)2435	**158.** 3)4518	**159.** 4)6443	**160.** 7)6335
161. 8)4944	**162.** 7)5866	**163.** 6)3868	**164.** 9)4177
165. 5)2340	**166.** 8)6975	**167.** 7)3066	**168.** 9)3852
169. 8)3696	**170.** 7)3339	**171.** 6)5150	**172.** 8)4224
173. 9)3771	**174.** 6)2983	**175.** 7)2988	**176.** 8)6536
177. 5)7861	**178.** 8)4993	**179.** 7)9561	**180.** 9)4133
181. 4)4553	**182.** 6)6106	**183.** 7)8211	**184.** 8)5341

CHAPTER IV

NOTATION AND NUMERATION

Writing numbers in figures is called **notation.** Reading numbers is called **numeration.**

ORAL EXERCISES

1. How many tens in a hundred? Count by tens to one hundred. How many hundreds in a thousand? Count by hundreds from one hundred to one thousand. How many figures are required to write ones? to write tens? to write hundreds? to write thousands?

2. What is the largest number that can be written with four figures? One more than nine thousand nine hundred ninety-nine is **ten thousand,** written 10,000.

3. How many figures does it take to write ten thousand? How many figures at the right of the comma?

4. What place, counting from the right, is hundreds? What place is thousands? What place is ten-thousands?

5. Count by thousands from 1000 to 10,000.

6. How many thousands are there in ten thousand?

7. Read 11,000, 12,000, 25,000, 50,000.

8. Count from 11,000 to 11,020.

9. Write fifty-five; five hundred fifty; five thousand fifty-five; fifty-five thousand fifty-five.

10. Read these numbers:

15,642	12,789	13,652
15,602	24,709	76,809
24,067	10,969	98,084
54,509	19,823	39,112
10,006	80,603	94,605

WRITTEN EXERCISES

1. Write in words the numbers in Example 10 of the preceding exercise.

2. Write in figures:

Sixty thousand six hundred sixty-four
Thirty-seven thousand eighty
Forty thousand six
Forty-nine thousand seven hundred eight
Ten thousand one
One thousand ten
Fifty thousand two
Sixty thousand sixteen
Nineteen thousand fifty
Seventy-seven thousand seven hundred seventy-seven
Ninety thousand eighteen
Sixty-eight thousand four hundred
Eighteen hundred
Ten thousand one hundred one
Ninety-five thousand three hundred sixty
Three thousand two hundred thirteen
Thirty-three thousand three

ADDITION

ORAL EXERCISES

See how quickly you can add these columns. You should be able to add them and check your work in one minute.

1.	2.	3.	4.	5.	6.
3	8	9	8	8	6
4	7	5	6	2	8
5	5	2	3	9	9
6	6	6	9	3	4
7	4	4	2	4	3
8	2	8	4	6	2
9	3	7	7	8	9
3	4	5	6	7	8

7. James spent \$0.15 for a ball, \$0.50 for a mitt, and \$0.40 for a bat. How much money did he spend?

Find the sums:

8.	9.	10.	11.	12.	13.
\$33	\$62	\$34	\$58	\$75	\$56
25	23	44	31	23	32

14. Read these, then find the sum:

$$\$8.25 + \$6.14 + \$4.37 + \$7.86 + \$9.50.$$

15. When the number of cents is less than ten cents, write the number of cents in the ones column and put 0 in the tens column, thus: two dollars and five cents is written \$2.05.

16. Write \$1 and 9 ct.; \$2 and 4 ct.; \$3 and 8 ct.; \$7 and 7 ct.

WRITTEN EXERCISES

1. Write in figures:

One dollar and twenty-five cents; four dollars and eighteen cents; six dollars and eleven cents; eighteen dollars and eighty-seven cents; four dollars and ten cents; two dollars and sixty-five cents; four hundred sixty dollars and sixty cents; sixteen dollars and six cents.

Add:

2.	3.	4.	5.	6.
$2.05	$16.27	$8.75	$16.40	$46.75
5.50	0.20	9.46	7.82	18.63
1.20	1.25	18.27	1.87	1.09
0.06	49.06	9.00	6.99	8.82
0.72	1.88	19.09	66.45	0.97
1.45	22.49	47.42	9.08	4.16

7.	8.	9.	10.
$42.88	$25.35	$87.82	$69.79
16.33	1.75	1.68	0.82
10.24	0.86	0.49	1.04
0.96	2.07	3.06	0.37
9.07	4.93	1.10	8.65
1.99	1.88	0.87	4.78

11. A man put into the bank these amounts: Monday, $1.98; Tuesday, $3.87; Wednesday, $1; Thursday, 93 cents; Friday, $2.20; Saturday, 74 cents. What were his savings for the week?

12. In one year Mr. Johnson paid the grocer $227.60; the dry goods merchant, $189.45; the coal dealer, $91.75. How much money did it take to pay all these bills?

DRILL WORK

Review the forty-five combinations, requiring each pupil to give instantly the sum of any two numbers pointed out in the columns at the top of p. 16. This drill should be continued with each pupil until he shows no hesitancy in giving correct answers. It is well to review these combinations often.

Tables like the one below may be put on the blackboard or on a large piece of cardboard and used for the constant drill necessary to secure rapid, accurate work in addition.

Let the scholars copy and add all the numbers in column (*a*) from line 1 to line 8; from line 4 to line 10; and so on.

Let the scholars copy and add all the numbers in line 1; all the numbers in line 2; and so on.

Other uses of the table will suggest themselves to the teacher.

	(*a*)	(*b*)	(*c*)	(*d*)
1.	9234	2635	4286	6436
2.	4675	1492	3796	8299
3.	8237	1896	4375	2131
4.	3416	6784	7689	4235
5.	2489	4996	2684	6785
6.	1872	2973	6344	8236
7.	2465	6466	1982	7980
8.	3498	4922	8646	4678
9.	7658	8634	7385	2842
10.	2864	3698	9247	3987
11.	9678	9264	1643	4631
12.	4235	7583	2425	5655
13.	6134	6228	8792	6774
14.	9224	4793	4884	1899
15.	4372	1859	1900	6573
16.	1844	8753	3678	8755
17.	5896	6418	5583	4817
18.	9345	7706	2345	2576

SUBTRACTION

ORAL EXERCISES

1. From \$5 make change for these purchases: \$4.25; \$3.75; \$2.25; \$3.50; \$3.85; \$4.15. Read thus, \$4.25, \$4.50, \$5.00, and so on.

2. From \$5 make change for these purchases: \$4.22; \$4.67; \$4.53; \$4.45; \$0.81.

Give the remainders quickly:

3.	4.	5.	6.	7.
\$2.86	\$2.90	\$3.86	\$4.85	\$2.10
0.54	0.75	1.42	3.75	0.90

8. From \$1 a boy received in change 50 cents, 25 cents, and 5 cents. What was the amount of his purchase?

9. What was the amount of change returned from \$1 if my purchases were 50 cents, 30 cents, and 12 cents?

10. A woman bought goods for \$3.72 and gave the clerk a 5-dollar bill. What change did she receive?

WRITTEN EXERCISES

Subtract and check your work:

1.	2.	3.	4.
\$70.05	\$34.92	\$89.05	\$67.13
18.96	16.89	14.07	42.49

5.	6.	7.	8.
\$50.00	\$60.10	\$65.40	\$72.01
14.89	18.94	12.75	61.19

9.	10.	11.	12.
\$82.14	\$43.66	\$52.17	\$68.05
14.86	18.79	41.08	40.19

13.	14.	15.	16.
\$94.43	\$90.64	\$46.91	\$84.62
12.68	42.19	21.28	45.56

17. Ray has \$5.30, and George has \$2.75. Ray has how much more money than George?

18. A man had \$75.25 in the bank and drew out \$48.78. How much had he left?

19. A man bought goods to the amount of \$62.49 and paid for them with a check for \$75. How much money did he receive in change?

20. There were 4875 votes cast for two candidates in an election. One candidate received 2896 votes. How many votes did the other candidate receive?

21. The population of a town now is 6782. This is a gain of 1095 inhabitants in ten years. What was the population ten years ago?

22. A man bought a farm for \$7885 and sold it for \$9000. How much did he gain?

23. Frank's father had \$1250 in a bank. He drew out \$533 and afterwards \$265. How many dollars did he still have in the bank?

24. Charles has 250 chickens. In one yard he has 46 chickens; in another, 35; and in another, 53. How many chickens has he that are not in these yards?

MULTIPLICATION

ORAL EXERCISES

1. Repeat the table of 10's. What is the last figure in each product?

2. When you multiplied by 10, what figure did you add to the multiplicand to obtain the product?

3. Multiply by 10 each of these numbers: 10, 20, 50, 100, 1000.

4. 10 × 10 ct. = how many cents? In what other way have you learned to write this?

5. 10 × \$2 = ? 10 × \$3.00 = ? 10 × \$3.50 = ?

What must you do with the period between dollars and cents when you multiply by 10?

6. Multiply by 10 each of these: \$6.00, \$4.15, \$5.50.

7. Give these products at sight:

6	12	22	150	210	625	889
10	10	10	10	10	10	10

\$5	15 gal.	35 yd.	124 bu.
10	10	10	10

235 ft.	365 da.	298 lb.	338 in.
10	10	10	10

8. A farmer sold 10 cows for \$34 apiece. How much did he receive for them?

9. There are 36 cabbage plants in a row. How many plants are there in 10 rows?

10. $\frac{1}{2}$ of 10 × 22 = ? $\frac{1}{3}$ of 10 × 30 = ?

WRITTEN EXERCISES

When the multiplier ends in 0 we write the multiplicand and the multiplier in this way:

$$\begin{array}{r} 24\cdot \\ 10 \\ \hline \end{array}$$

1. Find the products:

23 yd.	45 ft.	68 gal.	94 bu.	27 hr.	63 in.
10	10	10	10	10	10
\$123	\$1.16	\$125	\$1.09	\$1.13	
100	200	300	400	200	

2. At 40 ct. a dozen, what will 10 dozen oranges cost?

3. If a yard of ribbon costs \$0.73, what will 20 yards of ribbon cost?

4. How many dimes are there in 48 dollars?

5. A bushel of corn weighs 56 lb. How many pounds do 30 bushels weigh?

6. There are 95 soldiers in a company and 10 companies in a regiment. How many soldiers are there in a regiment?

7. At \$65 per acre, what is the value of a farm that contains 80 acres?

8. At 6 ct. a pound, what will be the cost of a barrel of sugar that contains 300 lb.?

ORAL EXERCISES

1. Multiply by 10 each of these numbers: 2, 7, 4, 8, 6, 5, 9, 10, 12, 14.

2. Count by 11's from 0 to 110. Repeat the table of 11's.

3. Multiply by 11 each of these numbers: 2, 5, 3, 7, 6, 4, 8, 9, 10.

4. Read these products quickly:

12	12	12	12	12	12	12	12	12
2	3	4	5	6	7	8	9	10

5. $4 \times 12 = ?$ $6 \times 12 = ?$ $3 \times 12 = ?$ $5 \times 12 = ?$
$9 \times 12 = ?$ $7 \times 12 = ?$ $2 \times 12 = ?$ $8 \times 12 = ?$

6. Read these tables:

$1 \times 11 = 11$	$11 \times 1 = 11$
$2 \times 11 = 22$	$11 \times 2 = 22$
$3 \times 11 = 33$	$11 \times 3 = 33$
$4 \times 11 = 44$	$11 \times 4 = 44$
$5 \times 11 = 55$	$11 \times 5 = 55$
$6 \times 11 = 66$	$11 \times 6 = 66$
$7 \times 11 = 77$	$11 \times 7 = 77$
$8 \times 11 = 88$	$11 \times 8 = 88$
$9 \times 11 = 99$	$11 \times 9 = 99$
$10 \times 11 = 110$	$11 \times 10 = 110$

$1 \times 12 = 12$	$12 \times 1 = 12$
$2 \times 12 = 24$	$12 \times 2 = 24$
$3 \times 12 = 36$	$12 \times 3 = 36$
$4 \times 12 = 48$	$12 \times 4 = 48$
$5 \times 12 = 60$	$12 \times 5 = 60$
$6 \times 12 = 72$	$12 \times 6 = 72$
$7 \times 12 = 84$	$12 \times 7 = 84$
$8 \times 12 = 96$	$12 \times 8 = 96$
$9 \times 12 = 108$	$12 \times 9 = 108$
$10 \times 12 = 120$	$12 \times 10 = 120$

Read and write these tables until you know them by heart.

WRITTEN EXERCISES

Multiply 32 by 23.

The multiplier is 23, which is equal to $20 + 3$. To find the product of 32 and 23 we multiply 32 by 3 and by 20, and add these products as in the left margin.

It is shorter to omit the 0 in 20 and multiply by 2, taking care to write the right-hand figure of the second product in the tens place.

$$\begin{array}{l} 32 \\ \underline{23 = 20 + 3} \\ 96 = 3 \times 32 \\ \underline{640 = 20 \times 32} \\ 736 = 23 \times 32 \end{array} \qquad \begin{array}{r} 32 \\ \underline{23} \\ 96 \\ \underline{64} \\ 736 \end{array}$$

Find the products:

1.	2.	3.	4.	5.	6.
24	23	42	33	43	44
22	32	23	42	24	33
7.	**8.**	**9.**	**10.**	**11.**	**12.**
35	25	62	35	45	42
34	23	57	24	35	65
13.	**14.**	**15.**	**16.**	**17.**	**18.**
65	76	82	47	58	69
61	51	56	32	53	22
19.	**20.**	**21.**	**22.**	**23.**	**24.**
77	46	48	27	47	39
38	24	39	36	55	79
25.	**26.**	**27.**	**28.**	**29.**	**30.**
31	56	44	92	65	78
28	24	32	76	56	64

31.	32.	33.	34.	35.
372	736	428	606	490
23	94	48	75	82

36.	37.	38.	39.	40.
$7.14	$5.78	$8.42	$6.82	$7.92
48	97	86	69	79

41.	42.	43.	44.	45.
$1.18	$2.19	$6.23	$5.69	$7.68
78	45	57	23	55

WRITTEN EXERCISES

1. What will 75 barrels of apples cost at $3.25 per barrel?

2. A fruit train of 19 cars was loaded with oranges. If there were 324 boxes in each car, how many boxes were in the whole train?

3. There are 231 cubic inches in a gallon. How many cubic inches are there in 28 gallons?

4. A dealer sold 28 lots at an average price of $366 per lot. How much did he receive for the lots?

5. What is the cost of 83 rods of fence at $0.47 a rod?

6. If a man spends $48 a year for cigars, how much will he spend for cigars in 25 years?

7. If a man earns $3.20 a day, how much will he earn in 28 days?

8. How many square feet are there in a lot 120 ft. long and 58 ft. wide?

9. If a ton of coal costs $6.75, what will 46 tons cost?

DIVISION

ORAL EXERCISES

1. Divide by 10 each of the following numbers: 20, 30, 40, 50, 60, 70, 80, 90, 110, 120, 140.

2. When a number ends in 0 it may be divided by 10 by canceling the 0; thus: $140 \div 10 = 14$.

3. Divide these numbers by 10: 240, 320, 460, 270.

4. How many 20's in 40? in 60? in 80?

WRITTEN EXERCISES

Divide 420 by 20.

$2\not{0})42\not{0}$
21

When both the divisor and the dividend end in 0 the division may be made shorter by cancellation. In this case we cancel the 0 of the 20 and the 0 of the 420, and then have to divide 42 by 2.

Find the quotients:

1. $720 \div 30$.
2. $1260 \div 60$.
3. $8400 \div 40$.
4. $9600 \div 80$.
5. $1610 \div 70$.
6. $2100 \div 60$.
7. $1140 \div 30$.
8. $1350 \div 50$.
9. $2320 \div 80$.
10. $4920 \div 40$.
11. $\$2940 \div \$70$.
12. $\$3150 \div \$50$.
13. $\$2340 \div \$90$.
14. $\$2870 \div \$70$.
15. $\$4440 \div \$60$.

ORAL EXERCISES

1. Divide by 2 each of these numbers: 4, 8, 10, 12, 16.

2. 2 is contained in 5 how many times? The remainder 1 is what part of 2? $5 \div 2 = 2\frac{1}{2}$.

3. Divide each of these numbers by 2 and give the remainder as a fraction: 7, 9, 11, 13, 15, 17, 19.

WRITTEN EXERCISES

Divide 3490 by 3.

$3\overline{)3490}$ $\quad 1163\frac{1}{3}$ The remainder 1 divided by 3 equals what? We write $\frac{1}{3}$ in the quotient.

Divide 3453 by 10.

$10\overline{)3453}$ $\quad 345\frac{3}{10}$ When the divisor is 10 and the dividend does not end in 0 the remainder is the last figure in the dividend.

Find the quotients and write the remainders as fractions:

1. $8432 \div 5$.	**12.** $9438 \div 5$.	**23.** $3215 \div 7$.
2. $3943 \div 3$.	**13.** $6842 \div 4$.	**24.** $4118 \div 8$.
3. $4362 \div 5$.	**14.** $4832 \div 5$.	**25.** $6167 \div 10$.
4. $7325 \div 4$.	**15.** $9728 \div 6$.	**26.** $5236 \div 7$.
5. $8234 \div 6$.	**16.** $6837 \div 8$.	**27.** $4189 \div 8$.
6. $5923 \div 7$.	**17.** $4193 \div 9$.	**28.** $5347 \div 6$.
7. $3894 \div 6$.	**18.** $8216 \div 7$.	**29.** $8775 \div 8$.
8. $9432 \div 5$.	**19.** $6392 \div 9$.	**30.** $4444 \div 10$.
9. $4352 \div 7$.	**20.** $4691 \div 10$.	**31.** $5873 \div 4$.
10. $6493 \div 4$.	**21.** $4193 \div 8$.	**32.** $6985 \div 8$.
11. $8423 \div 3$.	**22.** $6155 \div 9$.	**33.** $9227 \div 7$.

LONG DIVISION

ORAL EXERCISES

1. State the products at sight: 8×10; 9×10; 10×10; 10×11; 11×11; 11×12.

2. State the products at sight: 7×12; 9×12; 5×12; 8×12; 4×12; 6×12; 10×12; 11×12; 12×12.

3. Divide by 12 each of these numbers: 24, 60, 72, 84, 96, 36, 48, 108, 120, 132, 144.

4. Divide each number by 12 and state the quotient and the remainder. Read by columns:

1.	2.	3.	4.	5.	6.
24	36	48	60	72	84
25	38	52	62	75	86
29	39	50	65	74	85
32	37	51	61	73	90
30	42	56	69	80	94
26	45	54	70	82	92

5. The work in long division is exactly the same as the work in short division except that the work is written in full, and the quotient is written *over* the dividend.

WRITTEN EXERCISES

Divide 276 by 12.

How many times is 12 contained in 27 tens? Write 2 tens in the quotient. 12×2 tens = how many tens? Write 24 tens under 27 tens and draw a line under 24 tens. 27 tens − 24 tens = what? 3 tens + 6 = 36. How many times is 12 contained in 36? Write 3 in the quotient. 12×3 = what? Write 36 under 36. Draw a line and subtract. There is no remainder. The quotient is 23.

```
  23 quotient
12)276
  24
  36
  36
```

In long division write the first figure of the quotient over the right-hand figure of the first partial dividend.

Divide 714 by 21.

			Check
	34		34
Divide	21)714		21
Multiply	63		34
Subtract and bring down figure	84	Divide	68
	84	Multiply	714
		Subtract	

At first it will be helpful to form a table of the products of the divisor by the numbers from 1 to 9; thus:

$1 \times 21 = 21$	$4 \times 21 = 84$	$7 \times 21 = 147$
$2 \times 21 = 42$	$5 \times 21 = 105$	$8 \times 21 = 168$
$3 \times 21 = 63$	$6 \times 21 = 126$	$9 \times 21 = 189$

We find first how many times 21 is contained in 71. Look at the table. What is the largest number there that you can subtract from 71? How many 21's does it take to make 63? Write the 3 in the quotient over the 1 of the dividend. Subtract the 63 from the 71 and bring down the 4. How many times is 21 contained in 84? Write the 4 in the quotient. The quotient is 34.

NOTE. Pupils should learn to discontinue the use of the table as soon as they are familiar with the *form* used in long division.

To check the work, multiply the quotient by the divisor. If the work is correct, this product should equal the dividend.

Find the quotients:

1. $462 \div 21$.	**5.** $693 \div 21$.	**9.** $924 \div 21$.
2. $945 \div 21$.	**6.** $336 \div 21$.	**10.** $1386 \div 21$.
3. $1344 \div 21$.	**7.** $525 \div 21$.	**11.** $1113 \div 21$.
4. $1008 \div 21$.	**8.** $1722 \div 21$.	**12.** $1365 \div 21$.

ORAL EXERCISES

1. Divide each number by 21 and state quotient: 42, 63, 84. If you cannot tell the quotient readily, divide the first figure of the dividend by the first figure of the divisor.

2. Divide each number by 51 and state quotient: 102, 153, 204, 255. Divide the first *two figures* of the dividend by the first figure of the divisor.

WRITTEN EXERCISES

Find the quotients without the aid of a table:

1. $525 \div 21$.	5. $589 \div 31$.	9. $2079 \div 21$.
2. $943 \div 41$.	6. $1147 \div 31$.	10. $2601 \div 51$.
3. $496 \div 31$.	7. $5661 \div 51$.	11. $1491 \div 71$.
4. $744 \div 31$.	8. $1488 \div 31$.	12. $1071 \div 21$.

WRITTEN EXERCISES

Divide 4784 by 23:

$$\begin{array}{r} 208 \\ 23\overline{)4784} \\ \underline{46} \\ 184 \\ \underline{184} \end{array}$$

23 is contained in 47 hundreds how many times? 23×2 hundreds = what? 47 hundreds − 46 hundreds = what? 1 hundred + 8 tens = 18 tens. 18 will not contain 23, so we write 0 in the quotient. 18 tens + 4 = 184. 23 is contained in 184 how many times? 23×8 = what? There is no remainder. The quotient is 208.

Find the quotients:

1. $8282 \div 41$.	4. $4410 \div 42$.	7. $2700 \div 25$.
2. $4444 \div 22$.	5. $6798 \div 33$.	8. $8888 \div 44$.
3. $4896 \div 24$.	6. $9728 \div 32$.	9. $5668 \div 52$.

WRITTEN EXERCISES

1. Divide 153 by 39.

We cannot tell at sight how many times 39 is contained in 153, but we know that 3 is contained in 15, 5 times. $5 \times 39 = 195$, which is greater than 153, so the quotient must be *less* than 5. We then try 4 for the quotient. $4 \times 39 = 156$, which is still too great, so the quotient must be less than 4. $3 \times 39 = 117$. Thus we find:

$$\begin{array}{r} 3 \\ 39\overline{)153} \\ \underline{117} \\ 36 \text{ remainder} \end{array}$$

2. Divide 169 by 28.

2 is contained in 16 how many times? Why must the quotient be *less* than 8? Why is 7 too large?

Try 6.

If we should multiply by 5, our product would be too small, for the remainder then would be 29, or 1 more than 28, and *the remainder must always be less than the divisor.* So the quotient must be greater than 5.

$$\begin{array}{r} 6 \\ 28\overline{)169} \\ \underline{168} \\ 1 \text{ remainder} \end{array}$$

3. Obtain by trial the following quotients:

$27\overline{)162}$	$38\overline{)152}$	$49\overline{)392}$	$77\overline{)616}$
$39\overline{)320}$	$89\overline{)723}$	$68\overline{)485}$	$98\overline{)696}$

WRITTEN EXERCISES

Find the quotients and the remainders:

1. $6438 \div 74$.
2. $3526 \div 82$.
3. $4872 \div 56$.
4. $2697 \div 93$.
5. $3648 \div 32$.
6. $8512 \div 76$.
7. $8556 \div 23$.
8. $5110 \div 14$.
9. $5248 \div 64$.
10. $3441 \div 37$.
11. $5544 \div 66$.
12. $3154 \div 83$.
13. $3724 \div 49$.
14. $2730 \div 65$.
15. $6003 \div 87$.
16. $3870 \div 86$.
17. $6753 \div 57$.
18. $9362 \div 89$.
19. $8579 \div 73$.
20. $8957 \div 79$.
21. $7319 \div 53$.
22. $8609 \div 61$.
23. $6891 \div 31$.
24. $3954 \div 23$.
25. $3655 \div 43$.
26. $2576 \div 92$.
27. $7950 \div 39$.
28. $3835 \div 59$.
29. $3300 \div 75$.
30. $4296 \div 84$.
31. $6748 \div 48$.
32. $4993 \div 29$.
33. $5938 \div 36$.
34. $5743 \div 37$.
35. $9853 \div 49$.
36. $7369 \div 52$.
37. $9423 \div 63$.
38. $6578 \div 74$.
39. $6457 \div 59$.
40. $3579 \div 21$.
41. $7436 \div 34$.
42. $4589 \div 42$.
43. $5936 \div 47$.
44. $8372 \div 65$.
45. $8757 \div 67$.
46. $9212 \div 91$.
47. $2786 \div 22$.
48. $3764 \div 29$.

WRITTEN EXERCISES

1. An express train ran 546 miles in 13 hours. What was the rate per hour?

2. How many street cars, each containing 72 persons, will it take to carry 3240 persons?

3. A buyer paid \$2048 for 64 cows. How much was that for each cow?

4. In how many hours will an automobile go 1235 miles, if it goes at the rate of 19 miles an hour?

5. A bushel of corn weighs 56 pounds. How many bushels are there in 1792 pounds of corn?

6. If 27 typewriters cost a dealer $1701, how much does the dealer pay for each typewriter?

7. A farmer raised 4212 bushels of corn on 78 acres. How many bushels was that per acre?

8. A machine makes 3600 nails in an hour. How many nails does it make in a minute?

9. How many steel rails each 33 ft. long will be required for 5940 ft. of track? Remember that a track consists of two lines of rails.

10. In an orchard containing 1440 trees there are 45 rows of trees. How many trees are there in a row?

11. A man saved $1260 in 28 months. How many dollars did he save a month?

12. A telephone girl had 2156 calls in 22 days. What was the average number of calls per day?

13. An elevator can carry 12 persons each trip. How many trips must it make to carry 1500 persons?

14. A garden containing 1440 sq. ft. is 40 ft. long. How wide is it?

15. For every 25 papers a boy delivered he received a dime. How many dimes did he receive when he delivered 800 papers? How much money did he receive?

16. A man who lives 25 miles from Boston travels back and forth each day. How many days should a 2000-mile ticket last him?

17. A hotel uses 1260 bu. of potatoes in 45 weeks. How many bushels are used in 1 week?

FRACTIONS

ORAL EXERCISES

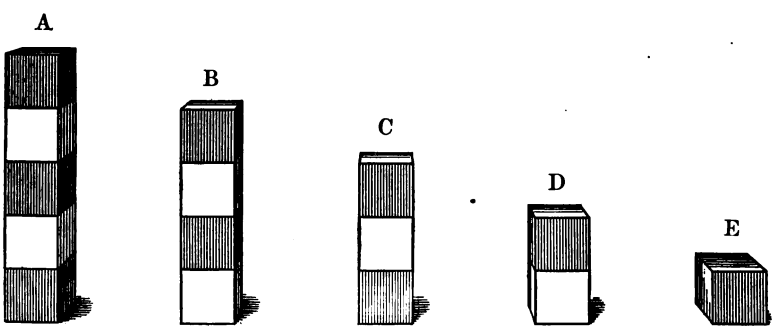
1. How many halves in $1\frac{1}{2}$ apples? in $2\frac{1}{2}$ apples? How many whole apples in $\frac{6}{2}$ apples? in $\frac{8}{2}$ apples? in $\frac{10}{2}$ apples?

2. $\$2\frac{1}{2} + \$3\frac{1}{2}$ = how many dollars? $\$4\frac{1}{2} - \$2\frac{1}{2}$ = how many dollars? $\$5\frac{1}{2} - \$1\frac{1}{2}$ = how many dollars?

3. Find the sum of $21\frac{1}{2}$ gal. and $2\frac{1}{2}$ gal.

4. If it takes $4\frac{1}{2}$ yards of cloth to make a skirt and $3\frac{1}{2}$ yards to make a jacket, how many yards are needed for both?

5. If I have \$5 and spend $\$2\frac{1}{2}$, how many dollars have I left?



6. Look at the blocks in this picture. If we call D equal to 1, what shall we call E? C? B? A? If we call B equal to 1, what shall we call E? D? C? A?

7. $\frac{1}{3} + \frac{2}{3} + \frac{2}{3}$ = how many thirds? $\frac{5}{3} = 1$ and how many thirds?

8. How many thirds are $\frac{5}{3} - \frac{2}{3}$? $1 - \frac{2}{3} = ?$

9. Add $2\frac{1}{3}$, $3\frac{1}{3}$, $4\frac{1}{3}$.

10. $8\frac{2}{3} - 4\frac{1}{3} = ?$

11. How many thirds is the sum of $\frac{1}{3}$, $\frac{2}{3}$, and $\frac{1}{3}$? $\frac{4}{3}$ are 1 and how many thirds? $\frac{5}{3}$ are 1 and how many thirds?

WRITTEN EXERCISES

Find the sum of $2\frac{2}{3}$ and $3\frac{2}{3}$.

$$\begin{array}{ll} 2\frac{2}{3} & \frac{2}{3} + \frac{2}{3} = \text{how many thirds?} \\ 3\frac{2}{3} & \frac{4}{3} = 1 \text{ and how many thirds?} \\ \hline 6\frac{1}{3} & 5 + 1\frac{1}{3} = 6\frac{1}{3}. \end{array}$$

Add:

1.	**2.**	**3.**	**4.**
$26\frac{2}{3}$	$57\frac{1}{3}$	$65\frac{1}{3}$	$96\frac{2}{3}$
16	$13\frac{2}{3}$	75	$17\frac{1}{3}$
5.	**6.**	**7.**	**8.**
16	26	$8\frac{1}{3}$	$15\frac{2}{3}$
$28\frac{1}{2}$	$28\frac{1}{2}$	14	$24\frac{1}{3}$
$14\frac{1}{2}$	$14\frac{1}{2}$	$6\frac{2}{3}$	18
9	13	$8\frac{1}{3}$	$15\frac{1}{3}$
9.	**10.**	**11.**	**12.**
$16\frac{1}{2}$	9	17	$19\frac{1}{2}$
20	$12\frac{1}{2}$	$15\frac{1}{2}$	$18\frac{1}{2}$
$7\frac{1}{2}$	15	$10\frac{1}{2}$	15
8	$1\frac{1}{2}$	5	$6\frac{1}{2}$
13.	**14.**	**15.**	**16.**
$92\frac{1}{3}$	$42\frac{2}{3}$	$15\frac{2}{3}$	$18\frac{2}{3}$
$18\frac{1}{3}$	6	$7\frac{1}{3}$	$19\frac{2}{3}$
$6\frac{1}{3}$	8	9	7
10	$10\frac{1}{3}$	$11\frac{1}{3}$	$8\frac{1}{3}$

17.	18.	19.	20.
14	$29\frac{1}{3}$	$16\frac{1}{3}$	$68\frac{1}{2}$
$18\frac{1}{3}$	$95\frac{1}{3}$	34	39
$25\frac{2}{3}$	28	$92\frac{2}{3}$	$92\frac{1}{2}$
$16\frac{1}{3}$	$36\frac{2}{3}$	$27\frac{2}{3}$	$38\frac{1}{2}$

21.	22.	23.	24.
$16\frac{1}{2}$	$72\frac{1}{2}$	$29\frac{1}{2}$	$78\frac{1}{3}$
$29\frac{1}{2}$	98	89	$94\frac{1}{3}$
38	$35\frac{1}{2}$	92	$87\frac{2}{3}$
$47\frac{1}{2}$	86	$43\frac{1}{2}$	68

25.	26.	27.	28.
$86\frac{1}{2}$	$83\frac{1}{3}$	$34\frac{1}{3}$	$77\frac{1}{3}$
$72\frac{1}{2}$	$98\frac{2}{3}$	$86\frac{2}{3}$	88
$98\frac{1}{2}$	$45\frac{1}{3}$	$74\frac{1}{3}$	$92\frac{2}{3}$
47	89	98	$45\frac{1}{3}$

ORAL EXERCISES

1. Draw a line 1 ft. long and divide it into thirds. 1 ft. $-\frac{1}{3}$ ft. = how many thirds of a foot? 1 ft. $-\frac{2}{3}$ ft. = how many thirds of a foot?

2. $1-\frac{1}{3}$ = how many thirds? $2-\frac{1}{3}=1$ and how many thirds? $3-\frac{1}{3}=2$ and how many thirds?

3. $1-\frac{1}{2}$ = how many halves? $2-\frac{1}{2}=1$ and how many halves? $3-\frac{1}{2}=2$ and how many halves?

4. From 19 take $5\frac{1}{3}$.

$$\begin{array}{r} 19 \\ 5\frac{1}{3} \\ \hline 13\frac{2}{3} \end{array}$$

We cannot take $\frac{1}{3}$ from nothing. So we take 1 from the 9 and change it to $\frac{3}{3}$. Then $\frac{1}{3}$ from $\frac{3}{3}$ leaves $\frac{2}{3}$, and 5 from the 18 remaining leaves 13. The remainder is $13\frac{2}{3}$.

WRITTEN EXERCISES

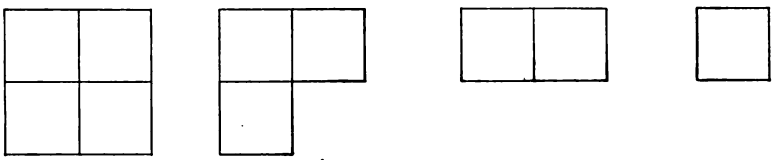
Subtract:

1.	2.	3.	4.
$224\frac{1}{2}$	$384\frac{1}{2}$	$502\frac{1}{2}$	$927\frac{1}{2}$
108	$292\frac{1}{2}$	284	$816\frac{1}{2}$
5.	**6.**	**7.**	**8.**
$345\frac{2}{3}$	$175\frac{1}{3}$	$186\frac{2}{3}$	$102\frac{2}{3}$
$146\frac{1}{3}$	98	64	$67\frac{1}{3}$
9.	**10.**	**11.**	**12.**
106	192	144	296
$84\frac{1}{2}$	$161\frac{1}{2}$	$82\frac{1}{2}$	$184\frac{1}{2}$
13.	**14.**	**15.**	**16.**
189	296	878	289
$126\frac{1}{3}$	$145\frac{1}{3}$	$426\frac{1}{3}$	$165\frac{1}{3}$
17.	**18.**	**19.**	**20.**
$308\frac{2}{3}$	$726\frac{1}{3}$	$982\frac{1}{3}$	$768\frac{1}{2}$
$149\frac{1}{3}$	348	$288\frac{1}{3}$	$415\frac{1}{2}$
21.	**22.**	**23.**	**24.**
$825\frac{1}{2}$	$638\frac{2}{3}$	$929\frac{1}{2}$	$762\frac{1}{2}$
477	$144\frac{1}{3}$	840	$341\frac{1}{2}$
25.	**26.**	**27.**	**28.**
$729\frac{2}{3}$	$896\frac{1}{2}$	$938\frac{2}{3}$	$638\frac{2}{3}$
$144\frac{1}{3}$	$419\frac{1}{2}$	$144\frac{1}{3}$	$145\frac{1}{3}$
29.	**30.**	**31.**	**32.**
245	469	638	$896\frac{1}{2}$
$123\frac{1}{2}$	$126\frac{1}{2}$	$142\frac{1}{3}$	$423\frac{1}{2}$

33. Find the sum in each of the above examples.

ORAL EXERCISES

1. How many fourths in 1? in $1\frac{1}{4}$? in $1\frac{3}{4}$? in 2? in $2\frac{1}{4}$? in $2\frac{3}{4}$? $\frac{5}{4}=1$ and how many fourths? $\frac{7}{4}=?$



2. $2\frac{1}{4}+3\frac{1}{4}=?$ $2\frac{1}{4}+3\frac{3}{4}=?$ $8\frac{3}{4}+9\frac{1}{4}=?$
3. $4\frac{3}{4}-2\frac{1}{4}=?$ $9\frac{1}{4}-3\frac{1}{4}=?$ $6\frac{1}{4}-1\frac{1}{4}=?$
4. $\$\frac{1}{4}+\$\frac{1}{4}+\$\frac{3}{4}$ are how many dollars and what part of a dollar?
5. If you have $\$\frac{3}{4}$ and spend $\$\frac{1}{4}$, what part of a dollar will you have left?
6. Add $1\frac{1}{4}$ ft., $2\frac{1}{4}$ ft., $3\frac{1}{4}$ ft.
7. $\frac{1}{4}+\frac{3}{4}+\frac{1}{4}=$ how many fourths? $\frac{5}{4}=1$ and how many fourths?

WRITTEN EXERCISES

Find the value of:

1. $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{3}{4}=?$
2. $8\frac{3}{4}$ yd. $-2\frac{1}{4}$ yd. $=?$
3. $2\frac{3}{4}$ gal. $-\frac{3}{4}$ gal. $=?$
4. $6\frac{1}{4}$ bu. $-2\frac{1}{4}$ bu. $=?$

Add:

5.	6.	7.	8.	9.
$19\frac{1}{4}$	$17\frac{3}{4}$	$13\frac{1}{4}$	23	16
$18\frac{1}{4}$	8	17	$18\frac{1}{4}$	$8\frac{1}{4}$
$17\frac{1}{4}$	9	$9\frac{1}{4}$	16	12
16	$14\frac{1}{4}$	$16\frac{1}{4}$	$19\frac{1}{4}$	$4\frac{3}{4}$

Add:

10.	11.	12.	13.	14.
$26\frac{1}{4}$	$52\frac{3}{4}$	87	95	$86\frac{1}{4}$
$14\frac{1}{4}$	$18\frac{1}{4}$	$64\frac{3}{4}$	$82\frac{1}{4}$	37
$18\frac{1}{4}$	6	75	75	$95\frac{3}{4}$
$19\frac{1}{4}$	14	$68\frac{1}{4}$	$49\frac{1}{4}$	69

15.	16.	17.	18.	19.
$125\frac{1}{4}$	$178\frac{3}{4}$	$296\frac{1}{4}$	875	176
$26\frac{1}{4}$	94	$187\frac{3}{4}$	$426\frac{3}{4}$	227
$207\frac{1}{4}$	$234\frac{1}{4}$	92	108	$95\frac{3}{4}$
$156\frac{1}{4}$	88	206	$97\frac{1}{4}$	$110\frac{1}{4}$

20.	21.	22.	23.	24.
812	$345\frac{3}{4}$	206	$625\frac{1}{4}$	976
$69\frac{1}{4}$	92	$187\frac{1}{4}$	193	$12\frac{1}{4}$
$87\frac{3}{4}$	187	$291\frac{3}{4}$	$182\frac{3}{4}$	$9\frac{3}{4}$
126	$66\frac{1}{4}$	87	96	101

25.	26.	27.	28.	29.
216	$192\frac{1}{4}$	183	$148\frac{3}{4}$	$100\frac{1}{4}$
$87\frac{3}{4}$	264	$196\frac{3}{4}$	99	98
125	$83\frac{3}{4}$	$47\frac{1}{4}$	187	$210\frac{3}{4}$
$95\frac{1}{4}$	126	166	$69\frac{1}{4}$	111

WRITTEN EXERCISES

Subtract:

1. $19 - 12\frac{1}{4}$

$19 = 18\frac{4}{4}$

$12\frac{1}{4}$

$6\frac{3}{4}$

2.	3.	4.	5.	6.
$86\frac{3}{4}$	$93\frac{1}{4}$	76	$88\frac{3}{4}$	$45\frac{1}{4}$
$24\frac{1}{4}$	$46\frac{1}{4}$	$23\frac{1}{4}$	$24\frac{1}{4}$	27
7.	**8.**	**9.**	**10.**	**11.**
$54\frac{3}{4}$	$63\frac{1}{4}$	85	$93\frac{3}{4}$	$75\frac{3}{4}$
$27\frac{1}{4}$	$29\frac{1}{4}$	$42\frac{1}{4}$	$28\frac{1}{4}$	56
12.	**13.**	**14.**	**15.**	**16.**
423	$396\frac{3}{4}$	$378\frac{1}{4}$	624	892
$121\frac{1}{4}$	$208\frac{1}{4}$	$122\frac{1}{4}$	$121\frac{1}{4}$	$401\frac{3}{4}$
17.	**18.**	**19.**	**20.**	**21.**
$398\frac{3}{4}$	439	$638\frac{3}{4}$	$822\frac{1}{4}$	695
$172\frac{1}{4}$	$172\frac{1}{4}$	$241\frac{1}{4}$	$493\frac{1}{4}$	$221\frac{1}{4}$
22.	**23.**	**24.**	**25.**	**26.**
$186\frac{3}{4}$	$206\frac{1}{4}$	$185\frac{3}{4}$	$215\frac{3}{4}$	$398\frac{3}{4}$
$97\frac{1}{4}$	$102\frac{1}{4}$	106	$106\frac{3}{4}$	$217\frac{1}{4}$
27.	**28.**	**29.**	**30.**	**31.**
148	269	366	452	$568\frac{1}{4}$
$96\frac{1}{4}$	$75\frac{1}{4}$	$145\frac{1}{4}$	$101\frac{1}{4}$	$209\frac{1}{4}$
32.	**33.**	**34.**	**35.**	**36.**
288	$105\frac{3}{4}$	209	$862\frac{1}{4}$	$712\frac{1}{2}$
$162\frac{1}{4}$	$96\frac{1}{4}$	$175\frac{1}{4}$	$192\frac{1}{4}$	$396\frac{3}{4}$

37. Find the sum in each of the above examples.

ORAL EXERCISES

1. Think one third of each of these numbers and then state $\frac{2}{3}$ of each: 6, 9, 15, 12, 21, 30.

2. Think one fourth of each of these numbers and then state $\frac{3}{4}$ of each: 16, 20, 40, 12, 8, 24.

3. Think one fifth of each of these numbers and then state $\frac{2}{5}$ of each: 35, 15, 40, 20, 50.

4. Think one sixth of each of these numbers and then state $\frac{5}{6}$ of each: 12, 24, 18, 54, 30, 48.

5. Think one eighth of each of these numbers and then state $\frac{3}{8}$ of each: 24, 40, 48, 16, 56, 80.

6. Think one tenth of each of these numbers and then state $\frac{3}{10}$ of each: 80, 40, 20, 60, 70.

WRITTEN EXERCISES

1. Find $\frac{1}{3}$ of 216; $\frac{2}{3}$ of 216.

To find $\frac{1}{3}$ of a number we divide the number by 3.

$$\begin{array}{r} 3\overline{)216} \\ 72 \text{ one third} \\ 2 \\ \hline 144 \text{ two thirds} \end{array}$$

2. Find $\frac{1}{3}$ of 336; $\frac{2}{3}$ of 336.

3. Find $\frac{1}{4}$ of 248; $\frac{3}{4}$ of 248.

4. Find $\frac{1}{5}$ of 725; $\frac{4}{5}$ of 725.

5. Find $\frac{1}{8}$ of 168; $\frac{7}{8}$ of 168.

6. Find $\frac{1}{6}$ of 426; $\frac{5}{6}$ of 426.

7. Find $\frac{1}{7}$ of 217; $\frac{3}{7}$ of 217.

8. James has 65 marbles and John has $\frac{1}{5}$ as many. How many marbles has John?

9. If 45 drops of water make a teaspoonful, how many drops make $\frac{3}{5}$ of a teaspoonful?

COMPARING FRACTIONS

ORAL EXERCISES

1. If we try to find the sum of 2 spellers, 5 readers, and 3 arithmetics, the answer will not be spellers or readers or arithmetics, but will be *books*. We can add only such things as have the same name.

2. In the same way, if we find the sum of $\frac{1}{2}$ and $\frac{1}{3}$, the answer will not be halves or thirds. We know $\frac{1}{2} = \frac{3}{6}$ and $\frac{1}{3} = \frac{2}{6}$; then $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

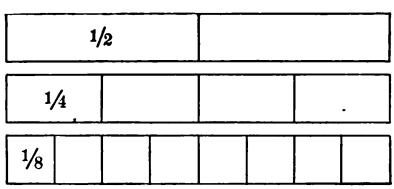
3. Look at the oblongs and tell the following sums and differences:

$\frac{1}{2} + \frac{1}{8} = ?$ $\quad \frac{1}{2} + \frac{1}{4} = ?$

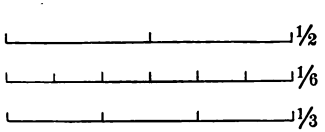
$\frac{1}{4} + \frac{1}{8} = ?$ $\quad \frac{3}{4} + \frac{1}{8} = ?$

$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = ?$ $\quad \frac{1}{2} - \frac{1}{8} = ?$

$\frac{1}{2} - \frac{1}{4} = ?$ $\quad \frac{1}{4} - \frac{1}{8} = ?$



4. $\frac{1}{3}$ = how many sixths? $\frac{1}{2}$ = how many sixths? $\frac{1}{3} + \frac{1}{2}$ = how many sixths? $\frac{1}{2} + \frac{1}{6}$ = how many sixths? $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ = how many sixths?



5. Which is the greater, $\frac{1}{2}$ or $\frac{1}{3}$? $\frac{5}{6}$ or $\frac{2}{3}$? Why?

6. If I have $\$\frac{1}{2}$ and spend $\$\frac{1}{4}$, what part of a dollar have I left?

7. If $\frac{1}{2}$ of a pound of candy is worth 20 ct., what is $\frac{1}{4}$ of a pound worth?

8. A boy spent $\$1\frac{1}{2}$ for a hat and $\$\frac{1}{4}$ for collars. How many dollars did he spend in all?

9. In an orchard of 27 trees, $\frac{1}{3}$ are pear trees. How many pear trees are there?

DRAWING EXERCISES

Draw lines to show the following:

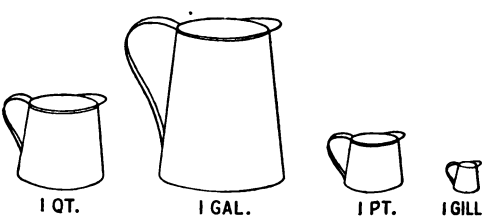
1. $\frac{1}{2} + \frac{1}{4}$.	**4.** $\frac{1}{4} + \frac{1}{8}$.	**7.** $\frac{1}{3} + \frac{1}{9}$.	**10.** $\frac{1}{3} + \frac{1}{6}$.
2. $\frac{1}{6} + \frac{1}{12}$.	**5.** $\frac{1}{3} + \frac{1}{12}$.	**8.** $\frac{3}{4} + \frac{1}{2}$.	**11.** $\frac{1}{2} + \frac{3}{4}$.
3. $\frac{1}{2} + \frac{1}{8}$.	**6.** $\frac{2}{3} + \frac{1}{6}$.	**9.** $\frac{1}{2} + \frac{1}{10}$.	**12.** $\frac{1}{4} + \frac{1}{12}$.

MEASURES

ORAL EXERCISES

1. How many quarts in a gallon? How many pints in a quart? How many pints in a gallon?

2. The smallest measure in the picture is called a gill. There are 4 gills in a pint. How many gills in a quart?



3. How many quarts in 4 gal.? in $4\frac{1}{2}$ gal.? in $5\frac{1}{4}$ gal.?

4. Out of a three-gallon cask of sirup I can fill a gallon jug and how many quart jars?

5. $1\frac{3}{4}$ gallons = how many quarts?

6. How many gills are there in 3 pints? in 5 pints?

7. Ruby's mother buys a quart of milk a day. In 30 days she will buy how many quarts? how many gallons?

8. At 10 ct. a quart, what is the cost of $1\frac{1}{2}$ gallons of cider?

9. If we burn a pint of kerosene in a day, how many days will a gallon of kerosene last?

10. 3 pt. + 4 pt. + 2 pt. = how many quarts?

11. How many quarts in 2 gal. 1 qt.? How many pints in 3 qt. 1 pt.?

12. How many gills in 1 pint 2 gills? in 1 pint 3 gills?

13. How many pints in 1 gal.? How many gills in 8 pt.?

14. We now know the following

TABLE

4 gills = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

15. For short we write **gi.** for gill or gills.

WRITTEN EXERCISES

1. How many feet in 3 yd. 2 ft.? in 4 yd. 1 ft.?

2. How many pecks in 5 bu. 2 pk.? in 4 bu. 3 pk.? in 6 bu. 1 pk.?

3. How many square feet in 1 sq. yd. 2 sq. ft.?

4. How many minutes in 2 hr. 15 min.?

5. How many hours in 1 da. 6 hr.? in 2 da. 3 hr.?

6. Think of a square yard. Draw a picture of it. The perimeter of 1 square yard equals how many feet?

7. What will $3\frac{1}{2}$ yards of ribbon cost at 10 cents a yard?

8. What will 2 qt. of gasoline cost at 16 ct. a gallon?

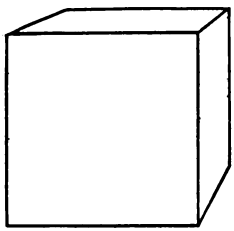
9. A mirror is 6 ft. long and 3 ft. wide. Its area equals how many square feet? how many square yards?

10. At 5 ct. a pound for sugar and 10 ct. a pound for rice, what will 6 lb. of each cost?

ORAL EXERCISES

1. A solid bounded by six equal squares is called a **cube.**

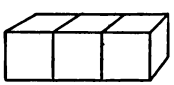
2. How many faces has a cube? How many edges? How many corners? Are the edges of a cube equal or unequal?



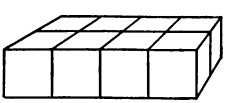
A cubic inch is a cube whose edges are each 1 inch long. For short we write **cu. in.** for cubic inch or cubic inches.

3. How long is each edge of a cubic foot? How long is each edge of a cubic yard?

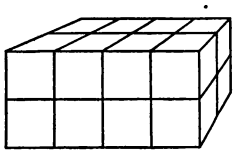
4. A block 3 inches long, 1 inch wide, and 1 inch thick contains $3 \times 1 \times 1$, or 3, cubic inches.



5. A block 4 in. long, 2 in. wide, and 1 in. thick contains how many rows of 4 cu. in.? How many cubic inches in all does it contain?



6. A block 4 in. long, 2 in. wide, and 2 in. thick contains how many cubic inches in the top layer? how many in the bottom layer? how many cubic inches in all?



7. Picture a block 5 in. long, 3 in. wide, and 2 in. high. How many cubic inches are there in one row? How many rows of 5 cu. in. are there in the top layer? how many in the bottom layer? How many layers of 15 cu. in. are there? How many cubic inches does the block contain?

8. Picture a solid 6 in. long, 4 in. wide, and 3 in. high. How many cubic inches are there in one row? How many rows of 6 cu. in. in each layer? How many layers of 24 cu. in.? How many cubic inches does the solid contain? This is called the **volume** of the solid.

9. Find the number of inch cubes that can be packed into a box which is 4 in. long, 3 in. wide, and 2 in. deep. How many cubes in one row? How many rows in one layer? How many cubes in one layer? How many layers? How many inch cubes in the box?

10. How many cubic inches in a solid 6 in. long, 4 in. wide, and 2 in. thick?

1 row = 6 cu. in.
1 layer = 4 × 6 cu. in.
volume = 2 × 4 × 6 cu. in. = 48 cu. in.

WRITTEN EXERCISES

Find the number of cubic inches in:

1. A block 4 in. long, 3 in. wide, 3 in. thick.
2. A brick 8 in. long, 4 in. wide, 2 in. thick.
3. A pencil box 7 in. long, 3 in. wide, 2 in. deep.
4. A paper box 9 in. long, 4 in. wide, 3 in. deep.
5. A block of wood 10 in. long, 5 in. wide, 4 in. thick.
6. A box 5 in. long, 4 in. wide, 3 in. deep.
7. A block of wood 12 in. long, 6 in. wide, 2 in. thick.
8. A box 9 in. long, 5 in. wide, 4 in. deep.
9. A box 10 in. long, 6 in. wide, 4 in. deep.

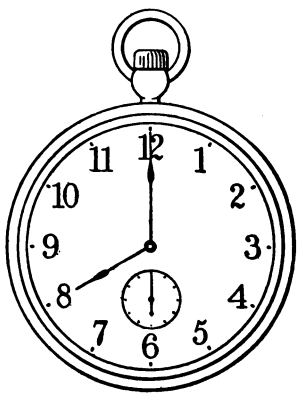
NOTE. If inch cubes can be obtained, let the pupils build these solids in the class work preceding the written exercises.

ORAL EXERCISES

1. Name the days of the week. How many days in one week? How many days in two weeks?

2. Name the months of the year. How many months in one year?

3. In what month does Christmas come? New Year's? Thanksgiving? Memorial Day? Washington's Birthday?



4. There are 60 seconds in one minute. Point to the second hand of the watch in the picture.

5. How many minutes in 1 hr.?

6. How many hours in 1 da.?

7. We now know the following

TABLE

60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day

8. For short we write **sec.** for second or seconds.

9. All months do not have the same number of days. The names of the months and the number of days in each are:

January	31 days	July	31 days
February	28 days	August	31 days
March	31 days	September	30 days
April	30 days	October	31 days
May	31 days	November	30 days
June	30 days	December	31 days

10. Here is an old rhyme which will help you to remember the number of days in each month:

Thirty days hath September,
April, June, and November;
All the rest have thirty-one,
Save February alone,
Whose days are twenty-eight in fine
Till leap year makes them twenty-nine.

WRITTEN EXERCISES

1. Write the date of to-day, thus: Tuesday, May 7, 1907. Write the date of three holidays. Write the date of your next birthday.

2. George Washington was born in the year 1732. He died in 1799. How old was he at the time of his death?

3. How many days from March 12 to March 20?

4. How old are you? In what year were you born? Subtract your age from the year of your last birthday and you will find the year of your birth.

5. Find the number of weeks and days in each of these months: January, June, August, November.

6. If you leave school at 4 P.M. on Monday and return at 9 A.M. on Tuesday, how many hours are you away from school?

7. Jack went to bed at 9 P.M. and arose at 6 A.M. the next day. How long was he in bed?

8. How many days is the Fourth of July after Memorial Day, May 30?

ORAL REVIEW

You have learned the following tables and should know them:

DRY MEASURE

2 pt. = 1 qt.
8 qt. = 1 pk.
4 pk. = 1 bu.

LIQUID MEASURE

4 gi. = 1 pt.
2 pt. = 1 qt.
4 qt. = 1 gal.

TIME MEASURE

60 sec. = 1 min.
60 min. = 1 hr.
24 hr. = 1 da.
7 da. = 1 wk.
4 wk. = 1 mo.
12 mo. = 1 yr.
365 da. = 1 yr.

REVIEW EXERCISES

1. Write the table of dry measure.
2. Write the table of liquid measure.
3. Write the table of time measure.
4. How many inches in 1 ft.? How many feet in 1 yd.?
5. How many square inches in 1 sq. ft.? Draw a square foot on the blackboard and show the number of square inches in it.
6. Draw a square yard on the floor and show the number of square feet in it.
7. What is the area of a 3-inch square? What is the perimeter?
8. How many quarts are 2 gal. 2 qt.?
9. How many feet are 5 yd. 2 ft.?
10. $4\frac{1}{2}$ lb. + $2\frac{1}{2}$ lb. = how many pounds?
11. It takes 30 inch cubes to fill a box. How deep is the box if the bottom layer is 5 in. long and 3 in. wide?

12. How many cubic inches in a 2-inch cube?

13. $2\frac{1}{2}$ ft. + 6 in. are how many feet?

14. Mary bought 8 yd. of cloth at 5 ct. a yard. How much change should she receive if she gave the storekeeper a half dollar?

15. A boy earns \$10 a month. How much does he earn in a year?

16. At \$3.85 a barrel, how much does a grocer receive for 9 barrels of flour?

17. Multiply 48,095 by 7.

18. Multiply 96,478 by 8.

19. Divide 54,350 by 5.

20. Divide 43,584 by 6.

21. At \$14 an acre, how many acres of land can be bought for \$4480?

22. Subtract 23,486 from 90,090.

23. If 62 acres of land cost \$992, what will 40 acres cost?

24. Find the sum of 8769 + 8543 + 7897 + 4876 + 4693.

25. What will 30 eggs cost at 30 cents a dozen?

26. Write in figures sixty thousand six.

27. One house is valued at \$7270 and another house at three times as much. How much are both together worth?

28. If 6 overcoats cost \$144, how many overcoats can be bought for \$1320?

29. How many packages of tea, 9 pounds in each package, can be made from 8847 pounds of tea?

30. When Mary's pail was half full she had $3\frac{1}{2}$ quarts of berries. At 12 cents a quart, how much money should she receive for her berries after her pail is filled?

31. At $1.37 each, what will 27 books cost?

32. Find the sum of 6743 + 7648 + 8974 + 649.

33. What is the difference between 40,412 and 25,391?

34. Mr. Jackson had $700. How much money will he have left after buying a horse for $150, a wagon for $45, and 4 cows for $35 each?

35. What is the cost of 15 yards of velvet at $1.25 a yard, and 5 yards of ribbon at 37 cents a yard?

36. How many eights are there in 6256?

37. If you have $7695 and I have $\frac{1}{9}$ as much, how much have we both together?

38. I have 63 bushels of corn in one bin, 54 bushels in another, 37 bushels in a third, and 29 bushels in a fourth. How many pecks of corn have I?

39. Mr. Brown paid $54 for a cow, 4 times as much for a horse, and as much for a carriage as for the cow and horse together. What was the cost of all?

40. Add two thousand seven; six thousand four hundred twenty-seven; nine thousand forty-five; eight thousand eighty-eight.

41. It is 33 miles from Haverhill to Boston. How many miles would a man ride in a week if he lives in Haverhill and goes into Boston to work each day?

42. Find the product of 250 and 529.

43. What is the cost of 16 barrels of flour at $6.25 a barrel, and 7 barrels of apples at $2.50 a barrel?

44. Divide 64,440 by 120.

45. Out of an army of 9876 men $\frac{1}{12}$ were lost. How many men remained?

46. A sleigh that cost $65 was sold for $47.50. What was the loss?

47. At $35 a bicycle, how many bicycles can be bought for $595?

48. A man who paid $7 each for a flock of 43 sheep sold them all for $325. How much did he gain?

49. Multiply 4236 by 54.

50. Multiply 936 by 78.

51. Divide 72,406 by 82.

52. Divide 37,063 by 46.

53. At the rate of 7 yards of silk for $15, what will 35 yards cost?

54. A woman paid $37 for a cloak, $7.75 for a hat, $2.25 for gloves, and $2 for some gaiters. What did she pay for all?

55. If 45 acres of land cost $5535, what is the price per acre?

56. Find the product of 6479 and 45.

57. Find the product of 8563 and 89.

58. From $136 take $13.63.

59. Find the sum of $9463 + 8756 + 6742 + 9087 + 4567$.

60. What is the cost of 19 chairs at $27.50 each?

61. Divide 18,027 by 9.

62. If a train runs 47 miles an hour, how far will it run in 168 hours?

63. If a man who earns $75 a month spends $64 each month, how long will it take him to save $154?

64. What will be the cost of 9 horses at $175.75 each, and 76 tons of hay at $18.50 each?

65. From a bin containing 516 bu. of oats, 65 bu. were sown and 73 bu. have been fed to horses. How many bushels of oats are left?

66. Multiply 7548 by 27.

67. Take 40,827 from 90,605.

68. If a ship sails 3655 miles in 17 days, how far does it sail in 1 day?

69. What would be the cost of fencing a park 36 rods long and 14 rods wide, at the rate of $2.50 a rod?

70. A man who had $12,000 bequeathed $\frac{1}{2}$ of it to his wife, $\frac{1}{3}$ to his daughter, and the rest to his son. How much did the son receive?

71. How many barrels of flour at $7 a barrel can be bought for $1141?

72. Find the product of 640 and 83.

73. Find the product of 5934 and 79.

74. Divide 49,726 by 47.

75. Divide 41,480 by 56.

76. Add $75.36, $42.97, $35.86, $97, and $126.53.

77. What is the cost of 29 pairs of boots at $5.25 a pair?

78. If a man having $1000 buys 5 horses at $152 each, and spends the rest of his money for cows at $40 apiece, how many cows does he buy?

79. At a rent of $23 a month for a house and a rent of $12 a month for a stable, what would be the rent of both for one year?

80. How many freight cars, costing $400 each, can be bought for $72,000?

CHAPTER V

NOTATION AND NUMERATION

ORAL EXERCISES

1. Name the places from right to left as you have learned them in writing numbers.

2. What is the largest number that can be written with five figures?

3. One more than ninety-nine thousand nine hundred ninety-nine is **one hundred thousand,** written 100,000.

4. It takes six figures to write hundred-thousands. In what place from the right is thousands? In what place is ten-thousands? In what place is hundred-thousands?

5. Read these numbers:

200,000	300,000	60,000
762,000	228,000	109,000
296,000	745,000	802,000

WRITTEN EXERCISES

1. Write in figures:

One hundred thousand
Two hundred thousand three hundred fifteen
Sixty-five thousand one
Three hundred thirty thousand three hundred

2. Write in figures:

Three hundred six thousand eight hundred four

Nine hundred ninety thousand four hundred forty

Seven hundred eighty-nine thousand six hundred sixteen

Nine hundred ninety-nine thousand nine hundred ninety-nine

ORAL EXERCISES

1. One more than nine hundred ninety-nine thousand nine hundred ninety-nine is **one million**, written 1,000,000.

2. To aid in reading large numbers you have used commas to separate the figures into groups of three, beginning at the right, thus: 365,429,603. When you write numbers the left-hand group may contain one, two, or three figures; each of the other groups *must* have *three* figures, thus: 2,345,628 and 16,500,207. You should place zeros in each group before the figures used if the number of figures in the group is less than three, thus: 5,003,027.

The name of the first group at the right is **units**; of the second group, **thousands**; of the third group, **millions.**

3. In reading we add the name of each group except the last, thus: 2 million, 345 thousand, 628.

4. Read these large numbers:

3,645,872	19,908,760
4,800,018	22,675,498
25,005,560	17,000,006
101,810,016	109,924,807
125,872,645	999,999,999

WRITTEN EXERCISES

1. Write in figures:

One million one thousand one hundred one
Twenty-two million four hundred sixty-seven
Two million three thousand sixty
Twenty million twenty thousand twenty
One million one hundred ten thousand
One million ten thousand ten
One million sixty-seven thousand forty-nine
One million nine thousand
One hundred million one hundred thousand one
Two hundred thousand twenty
Seventy thousand seven hundred
Three million two hundred sixty-eight thousand five hundred thirty-seven

ADDITION

ORAL EXERCISES

1. Count by 3's from 49 to 100 and back to 1.
2. Count by 7's from 50 to 99 and back to 1.
3. Count by 8's from 18 to 98 and back to 2.
4. Count by 9's from 19 to 100 and back to 1.
5. To each of the numbers below add 2; 3; 4; 5; 6; 7; 8; 9. Begin at the left-hand column. Repeat this exercise, beginning at the right-hand column:

83	59	94	69	38	62	95	47
54	44	87	72	43	48	49	61
66	83	67	48	53	56	88	54

WRITTEN EXERCISES

1. Iowa contains 56,025 square miles; Illinois, 56,650 square miles; South Dakota, 77,650 square miles. What is the combined area of these states?

2. A certain post office received 4500 letters on Monday; 3250 on Tuesday; 3770 on Wednesday; 2200 on Thursday. How many letters were received in the four days?

3. A farmer sells five loads of hay. The first weighs 2420 lb.; the second, 2100 lb.; the third, 1962 lb.; the fourth, 1860 lb.; the fifth, 2040 lb. What do the five loads weigh together?

Add:

4.	5.	6.	7.
$127.65	$375.62	$82.69	$141.90
84.93	104.09	145.35	8.26
8.08	10.90	60.04	90.45
124.62	6.75	7.29	110.67
0.75	102.64	600.06	9.92

8.	9.	10.	11.
$428.86	$427.99	$918.07	$345.67
893.05	8.86	42.86	89.92
8.94	23.47	3.98	10.84
10.06	19.08	10.42	61.25
12.39	9.86	622.18	482.37

When a quantity is expressed in *two or more measures* it is called a **denominate number**; thus: 5 gal. 2 qt. 1 pt. is a denominate number.

ADDITION OF DENOMINATE NUMBERS

Add 24 qt. 1 pt. and 7 qt. 1 pt.

24 qt. 1 pt.
7 qt. 1 pt.
32 qt.

Write pints under pints and quarts under quarts. 1 pt. and 1 pt. are 2 pt. or 1 qt. Add the 1 qt. to the sum of the quarts. The whole sum is 32 qt.

Add 7 wk. 4 da. and 11 wk. 6 da.

7 wk. 4 da.
11 wk. 6 da.
19 wk. 3 da.

Write days under days and weeks under weeks. 6 da. and 4 da. are 10 da., or 1 wk. and 3 da. Write the 3 da. Add the 1 wk. to the sum of the weeks. The whole sum is 19 wk. 3 da.

WRITTEN EXERCISES

Add:

1.	2.	3.
21 yd. 2 ft.	18 wk. 3 da.	10 gal. 3 qt.
14 yd. 2 ft.	15 wk. 5 da.	18 gal. 2 qt.
4.	**5.**	**6.**
14 ft. 10 in.	25 yd. 2 ft.	47 ft. 8 in.
26 ft. 11 in.	14 yd. 2 ft.	36 ft. 7 in.

Add 9 bu. 3 pk. and 5 bu. 2 pk.

Write pecks under pecks and bushels under bushels.

9 bu. 3 pk.
5 bu. 2 pk.
15 bu. 1 pk.

3 pk. and 2 pk. are 5 pk., or 1 bu. and 1 pk. Write the 1 pk., and add the 1 bu. to the sum of the bushels. The whole sum is 15 bu. 1 pk.

WRITTEN EXERCISES

Add:

1.	2.	3.
17 bu. 2 pk.	37 bu. 1 pk.	48 bu. 3 pk.
23 bu. 3 pk.	29 bu. 3 pk.	62 bu. 3 pk.

4.	5.	6.
45 bu. 2 pk.	49 bu. 3 pk.	73 bu. 3 pk.
57 bu. 1 pk.	63 bu. 2 pk.	86 bu. 1 pk.
92 bu. 3 pk.	84 bu. 1 pk.	49 bu. 2 pk.

Add 10 hr. 42 min. and 8 hr. 37 min.

Write minutes under minutes and hours under hours.

10 hr. 42 min.
8 hr. 37 min.
19 hr. 19 min.

42 min. and 37 min. are 79 min., or 1 hr. 19 min. Write the 19 min. and add the 1 hr. to the sum of the hours. The whole sum is 19 hr. 19 min.

WRITTEN EXERCISES

Add:

1.	2.	3.
7 hr. 35 min.	10 hr. 32 min.	8 hr. 42 min.
11 hr. 48 min.	9 hr. 38 min.	12 hr. 28 min.

4.	5.	6.
6 hr. 23 min.	8 hr. 27 min.	9 hr. 17 min.
9 hr. 27 min.	10 hr. 38 min.	14 hr. 28 min.
5 hr. 42 min.	11 hr. 36 min.	36 hr. 19 min.

In ordinary business 30 days is usually considered as a month.

Add 3 yr. 4 mo. 15 da. and 5 yr. 9 mo. 17 da.

15 da. and 17 da. are 32 da., or 1 mo. 2 da. Write the 2 da. and add the 1 mo. to the sum of the months. 13 mo. and 1 mo. are 14 mo., or 1 yr. 2 mo. Write the 2 mo. and add the 1 yr. to the sum of the years. The whole sum is 9 yr. 2 mo. 2 da.

3 yr. 4 mo. 15 da.
5 yr. 9 mo. 17 da.
9 yr. 2 mo. 2 da.

WRITTEN EXERCISES

Add:

1.	2.
2 yr. 7 mo. 21 da.	6 yr. 7 mo. 14 da.
5 yr. 9 mo. 18 da.	9 yr. 8 mo. 25 da.

3.	4.
11 yr. 2 mo. 16 da.	8 yr. 8 mo. 12 da.
24 yr. 8 mo. 9 da.	14 yr. 9 mo. 26 da.
13 yr. 7 mo. 11 da.	21 yr. 6 mo. 24 da.

5.	6.	7.
2 lb. 8 oz.	6 lb. 14 oz.	8 lb. 9 oz.
9 lb. 10 oz.	9 lb. 7 oz.	22 lb. 13 oz.

8.	9.	10.
3 lb. 4 oz.	15 lb. 6 oz.	6 lb. 8 oz.
11 lb. 8 oz.	18 lb. 9 oz.	9 lb. 11 oz.
14 lb. 9 oz.	24 lb. 10 oz.	8 lb. 14 oz.

SUBTRACTION

ORAL EXERCISES

1. Count backward from 100 by 6's; 7's; 8's; 9's.

2. Give the remainders at sight:

53	75	94	85	66	87
46	68	88	77	58	79

3. Give the remainders at sight:

45	46	55	43	52	76
26	27	36	18	39	57

4. Mabel spent 85 cents for Christmas and Lucy spent 42 cents. How much more did Mabel spend than Lucy?

5. Grandfather is 83 years old and father is 49 years old. How much older than father is grandfather?

WRITTEN EXERCISES

Subtract and check:

1. \$690.64 436.89	5. \$449.63 148.39	9. \$903.81 426.75	13. \$875.52 146.63
2. \$800.01 49.67	6. \$206.49 107.92	10. \$842.67 330.59	14. \$487.65 209.96
3. \$875.50 49.95	7. \$306.11 199.89	11. \$475.61 102.09	15. \$694.26 10.08
4. \$900.00 188.92	8. \$310.05 109.87	12. \$521.01 166.23	16. \$427.03 226.98

17. Pikes Peak is 14,147 ft. high. Mt. Washington is 6288 ft. high. How much higher is Pikes Peak than Mt. Washington?

18. Iowa has an area of 56,025 square miles. Illinois has an area of 56,650 square miles. How many more square miles has Illinois than Iowa?

19. In a certain year the population of St. Louis was 575,238 and the population of Boston was 560,892. How much larger than Boston was St. Louis?

20. The deposits of the First National Bank in a certain day were $2240.62. Those of the Commercial Bank were $3000.50. How much greater were the deposits of the Commercial than of the First National?

SUBTRACTION OF DENOMINATE NUMBERS

WRITTEN EXERCISES

Subtract:

1.	2.	3.
14 yd. 2 ft.	10 wk. 6 da.	40 ft. 8 in.
8 yd. 1 ft.	3 wk. 4 da.	32 ft. 6 in.

Subtract 9 yd. 2 ft. from 18 yd. 1 ft.

We write feet under feet and yards under yards. Since we cannot take 2 ft. from 1 ft., we take 1 yd. from the 18 yd., change it to feet and add it to the 1 ft., making 4 ft. Then 2 ft. from 4 ft. leaves 2 ft. 9 yd. from 17 yd. leaves 8 yd. The remainder is 8 yd. 2 ft.

18 yd. 1 ft.
9 yd. 2 ft.
8 yd. 2 ft.

WRITTEN EXERCISES

Subtract:

1.	2.	3.
31 gal. 1 qt.	43 wk. 5 da.	87 yd. 0 ft.
19 gal. 3 qt.	29 wk. 6 da.	49 yd. 2 ft.
4.	**5.**	**6.**
85 bu. 2 pk.	45 lb. 10 oz.	47 yr. 5 mo.
76 bu. 3 pk.	28 lb. 12 oz.	28 yr. 9 mo.
7.	**8.**	**9.**
23 hr. 9 min.	13 hr. 7 min.	20 hr. 10 min.
17 hr. 30 min.	9 hr. 26 min.	16 hr. 20 min.

10.	11.
9 yr. 7 mo. 8 da.	17 yr. 6 mo. 4 da.
3 yr. 4 mo. 10 da.	8 yr. 2 mo. 9 da.
12.	**13.**
11 yr. 8 mo. 6 da.	4 yr. 4 mo. 6 da.
8 yr. 6 mo. 14 da.	2 yr. 3 mo. 9 da.

MULTIPLICATION

REVIEW EXERCISES

1. Give the table of 6's and add 7 to each product.
2. Give the table of 7's and add 6 to each product.
3. Give the table of 8's and add 9 to each product.
4. Give the table of 9's and add 8 to each product.

WRITTEN EXERCISES

Multiply:

1. \$114 by 32.
2. \$112 by 76.
3. \$365 by 56.
4. \$372 by 23.
5. \$283 by 64.
6. \$564 by 47.
7. \$259 by 57.
8. \$538 by 38.
9. \$467 by 59.
10. \$736 by 94.
11. \$714 by 48.
12. \$578 by 97.
13. \$842 by 86.
14. \$682 by 69.
15. \$617 by 82.
16. \$426 by 91.
17. \$324 by 28.
18. \$416 by 29.
19. \$675 by 25.
20. \$434 by 26.
21. \$624 by 34.
22. \$715 by 25.
23. \$634 by 48.
24. \$417 by 53.
25. \$525 by 64.
26. \$812 by 14.
27. \$476 by 42.
28. \$385 by 74.
29. \$416 by 46.
30. \$327 by 81.

Multiply 432 by 126.

$$\begin{array}{r} 432 \\ 126 \\ \hline 2592 \\ 864 \\ 432 \\ \hline 54432 \end{array}$$

Multiply 432 by 6 and write the product with the right-hand figure in the ones place. Next multiply 432 by 2 and write the right-hand figure under the 2 of the multiplier. Multiply 432 by 1 and write the right-hand figure under the 1 of the multiplier. The sum of these three partial products is 54,432, which is the product of 432 and 126.

WRITTEN EXERCISES

Find the products:

1. 127×125.
2. 436×232.
3. 167×184.
4. 224×141.
5. 617×122.
6. 890×124.
7. 226×141.
8. 375×123.
9. 612×412.
10. 185×653.
11. 124×234.
12. 415×165.
13. 325×124.
14. 617×422.
15. 831×232.

WRITTEN EXERCISES

Multiply 286 by 304.

$$\begin{array}{r} 286 \\ 304 \\ \hline 1144 \\ 858 \\ \hline 86944 \end{array}$$

Multiply 286 by 4 and write the product with the right-hand figure directly under the 4. When we multiply 286 by 0 we get only 0, because 0 times *any* number is 0. So do not write anything for the product of 286 by 0, but multiply at once by 3, placing the right-hand figure of the product under the 3. The whole product is 86,944.

In multiplying always put down the first figure you get in the product under the figure by which you multiply.

To check the work in multiplication, divide the product by the multiplier. If the multiplication is correct, this quotient should be equal to the multiplicand.

Multiply and check:

1. 365×407.
2. 675×309.
3. 623×373.
4. 467×503.
5. 827×560.
6. 3159×507.
7. 9872×603.
8. 5983×704.
9. 7000×564.
10. 7860×468.
11. 204×4268.
12. 495×2070.
13. 538×9326.
14. 500×3792.
15. 805×8496.

DIVISION

ORAL EXERCISES

1. How many 10's in 100? in 1000? in 2000?
2. How many 20's in 400? 30's in 600? 40's in 800?
3. How many 100's in 300? in 500? in 1000? in 5000?
4. How many times is 10 contained in 250? \$1 in \$25?

5. When the divisor ends in one or more zeros you may cancel the zeros at the right of the divisor and also cancel the same number of figures at the right of the dividend.

6. Divide by 2000 these numbers: 24,000, 24,357, 25,357.

$2\cancel{000})24\cancel{000}$ 12

$2\cancel{000})24\cancel{357}$ $12\frac{357}{2000}$

$2\cancel{000})25\cancel{357}$ $12\frac{1357}{2000}$

If there is any remainder when you divide, annex to it the figures which you have canceled in the dividend and write the complete remainder over the whole divisor.

WRITTEN EXERCISES

Find the quotients and the remainders:

1. 60)360
2. 60)3657
3. 60)3795
4. 700)4900
5. 700)4968
6. 700)5368
7. 4000)36000
8. 4000)36075
9. 4000)38075

WRITTEN EXERCISES

Divide and check the work:

1. 5938 by 36.
2. 5743 by 37.
3. 9853 by 49.
4. 7369 by 52.
5. 9423 by 63.
6. 6578 by 74.
7. 6457 by 59.
8. 3579 by 21.
9. 7436 by 34.
10. 4589 by 42.
11. 5936 by 47.
12. 8372 by 65.
13. 8757 by 67.
14. 9212 by 91.
15. 2786 by 22.
16. 3764 by 29.
17. 6753 by 57.
18. 9362 by 89.
19. 8579 by 73.
20. 8957 by 79.
21. 7319 by 53.
22. 8609 by 61.
23. 6891 by 31.
24. 3954 by 23.
25. 8332 by 71.
26. 9888 by 93.
27. 7112 by 43.
28. 2931 by 19.
29. 9213 by 29.
30. 8778 by 55.

WRITTEN EXERCISES

1. A farmer paid $3318 for 79 acres of land. How much was that per acre?

2. How many loads of corn, each containing 22 bushels, are there in a crib containing 1716 bushels?

3. Mr. Yale shipped to Chicago 56 head of cattle for which he received $3360. What was the average price?

4. If each of the cars in a train weighs when loaded 54 tons, how many cars are there in a train if the combined weight is 1188 tons?

5. A man saves $37 a month. How long will it take him to save $1480?

6. Divide 1,965,579 by 323.

$$
\begin{array}{r}
6085\tfrac{1}{3}\tfrac{2}{2}\tfrac{4}{3} \\
\hline
323\overline{)1965579} \\
1938 \\
\hline
2757 \\
2584 \\
\hline
1739 \\
1615 \\
\hline
124
\end{array}
$$

WRITTEN EXERCISES

Divide:

1. $16,875 \div 125$.	6. $86,123 \div 201$.	11. $117,440 \div 367$.
2. $25,868 \div 116$.	7. $38,612 \div 302$.	12. $259,021 \div 436$.
3. $26,288 \div 212$.	8. $59,824 \div 215$.	13. $472,932 \div 783$.
4. $28,413 \div 231$.	9. $70,512 \div 226$.	14. $179,450 \div 485$.
5. $61,238 \div 101$.	10. $50,483 \div 245$.	15. $349,206 \div 858$.

MEASURES

ORAL EXERCISES

1. How many inches in 1 ft.? How many feet in 1 yd.?

2. Measure $5\frac{1}{2}$ yd. from the front wall of the room. This distance is called a rod. A rod is how many yards?

3. Try to stand one rod away from the blackboard. Measure the distance to see if it is $5\frac{1}{2}$ yd.

4. Measure one side of the school lot and give the length in rods.

5. Name some place that is a mile from the schoolhouse. What streets or houses do you know that are a mile apart? What street or road have you seen that is a mile long? There are 320 rods in a mile.

6. We use inches, feet, and yards to measure short distances. What measures do we use for long distances?

7. How many feet in 5 yards? in $5\frac{1}{2}$ yards? in 1 rod?

8. How many feet in 2 rods?

9. Draw lines on the blackboard to represent 1 yard and 1 rod (scale 1 ft. to 1 yd.).

10. How many rods in a half of a mile? in a quarter of a mile? in an eighth of a mile?

11. We now know the following

TABLE

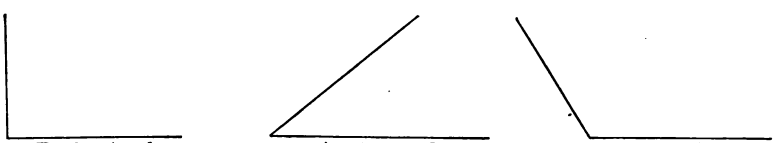
12 inches = 1 foot
3 feet = 1 yard
$5\frac{1}{2}$ yards, or $16\frac{1}{2}$ feet = 1 rod
320 rods, or 5280 feet = 1 mile

12. For short we write **rd.** for rod or rods, and **mi.** for mile or miles.

WRITTEN EXERCISES

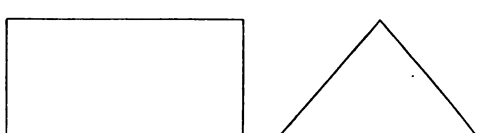
1. How many rods in 11 yards? How many feet?
2. How many feet in $\frac{1}{2}$ mile? in $\frac{1}{4}$ mile? in $\frac{1}{8}$ mile?
3. How many rods in 2 miles? in $\frac{1}{2}$ mile?
4. How many inches in 1 yard? in $2\frac{1}{2}$ yards?
5. How many feet in 720 inches? How many yards?
6. 5280 feet are how many yards?
7. A pasture $\frac{1}{8}$ of a mile long and 20 rods wide will need how many rods of fence to inclose it?
8. Change 12 miles to rods; to yards; to feet.

ORAL EXERCISES



Right Angle Acute Angle Obtuse Angle

1. Draw a right angle; an acute angle; an obtuse angle.
2. Which angle is smaller than a right angle? Which angle is greater than a right angle?
3. In how many directions does a line extend? a square? an oblong? Oblongs and squares are called **rectangles.**



Rectangle Triangle

4. How many angles has a rectangle? What kind of angles? Show the perimeter of the rectangle in the picture. Show the area. How many angles has a triangle? What kind of angles has the triangle in the picture?

5. What is the area of a rectangle 5 inches long and 4 inches wide? What is the perimeter?

6. What is the area of a 5-inch square? of a 6-inch square? of a 12-inch square?

7. How many square inches make a square foot?

8. How many square feet make a square yard?

9. Measure a square rod in the school yard and place a pupil at each corner.

10. It takes 160 square rods to make an acre. The area of a strip of land 40 rods long and 4 rods wide is an acre, or 160 square rods.

11. A square mile is how long? how wide? A square mile contains 640 acres. How many 80-acre farms equal a square mile?

12. We now know the following

TABLE

160 square rods = 1 acre
640 acres = 1 square mile

13. For short we write **sq. rd.** for square rod or square rods; **A.** for acre or acres; and **sq. mi.** for square mile or square miles.

WRITTEN EXERCISES

1. How many square inches are there in 22 square feet?

2. How many square rods are there in 3 acres?

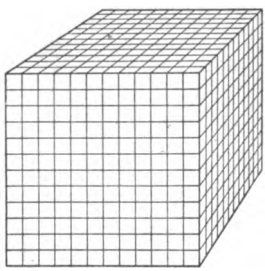
3. A field is 40 rods long and 20 rods wide. How many square rods does it contain? How many acres?

4. How many square rods in $9\frac{1}{2}$ acres?

5. How many acres are there in 10 sq. mi.?

ORAL EXERCISES

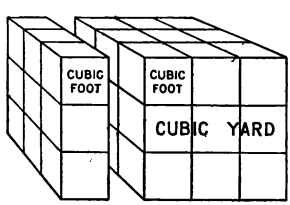
1. Show an inch and a square inch by drawings. Can you draw a picture of a cubic inch?



2. How many cubic inches in a solid that is 5 inches long, 4 inches wide, and 3 inches thick?

3. How many inches long is a cubic foot? How many cubic inches in one row? How many rows of 12 cubic inches in each layer? How many cubic inches in a layer? How many layers of 144 cubic inches each? How many cubic inches in a cubic foot? A cubic foot contains 12 layers of 12×12 cubic inches.

4. A cubic yard containing 3 layers of 3×3 cubic feet = how many cubic feet?



$12 \times 12 \times 12$ cubic inches = 1728 cubic inches = 1 cubic foot.

$3 \times 3 \times 3$ cubic feet = 27 cubic feet = 1 cubic yard.

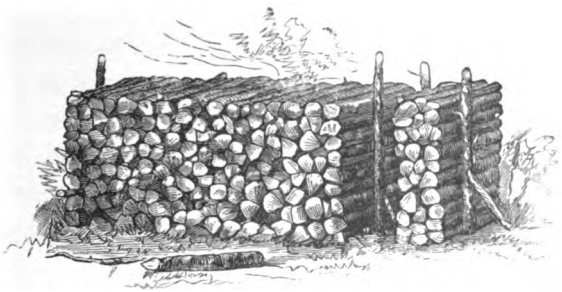
WRITTEN EXERCISES

1. A coal bin is 12 feet long, 6 feet wide, and 7 feet deep. How many cubic feet does it contain?

2. How many cubic yards of earth were taken out in digging a cellar 6 yd. long, 4 yd. wide, and 2 yd. deep?

3. How many cubic feet of air are there in a schoolroom 30 feet long, 24 feet wide, and 12 feet high? How many cubic yards are there?

4. A cord of wood is 8 feet long, 4 feet wide, and 4 feet high. How many cubic feet does a cord contain?



5. A wagon box 7 ft. long, 3 ft. wide, 2 ft. high is filled with coal. How many cubic feet are there in the load?

6. A cistern 6 feet long, 5 feet wide, and 4 feet deep contains how many cubic feet?

7. How many cubic inches in a 10-inch cube?

ORAL EXERCISES

1. How many ounces in a pound? in $1\frac{1}{2}$ pounds? in $1\frac{1}{4}$ pounds? in 2 pounds? in $2\frac{1}{8}$ pounds?

2. What is the postage, at $\frac{1}{2}$ ct. an ounce, on a package weighing 6 oz.?

3. Find the cost of 8 oz. of pepper at 16 ct. a pound.

4. The ton is used in weighing coal, hay, iron, and other heavy articles. There are 2000 pounds in a ton. What part of a ton is 1000 lb.? What part is 500 lb.?

5. What will $2\frac{1}{2}$ tons of hay cost at \$10 a ton?

6. At $\frac{1}{2}$ ct. an ounce, what will it cost to send by mail a book weighing $\frac{1}{2}$ lb.?

7. We now know the following

TABLE

16 ounces = 1 pound
2000 pounds = 1 ton

8. For short we write **t.** for ton or tons.

WRITTEN EXERCISES

1. Find the perimeter and the area of a field 40 rd. long and 24 rd. wide. Draw the plan of the field on a scale of $\frac{1}{4}$ in. to 4 yd.

2. A mile of gas pipe is laid at a cost of $5 a rod. What is the cost of laying the pipe?

3. At 40 ct. a dozen, what will 30 lemons cost?

4. A horse can travel a mile in 5 minutes. How far can he go in an hour? in $2\frac{1}{2}$ hours?

5. How many yards of braid will be required to bind a rug 5 ft. long and 3 ft. wide?

6. If a man travels 70 miles a day, how many weeks will it take him to make a trip of 1470 miles?

7. At $40 an acre, what will two 80-acre farms cost?

8. A milk dealer sells every day 16 cans of milk, each holding 2 gallons. How many quarts does he sell?

9. How many quarts in 248 pints? How many gallons?

10. A grocer bought 4 bushels of apples at 80 ct. a bushel and sold them at 25 ct. a peck. How much did he gain?

11. What is the price of a dozen oranges at the rate of 3 oranges for a dime?

12. A man earns 35 ct. an hour and works 2 days of 8 hours each. How much does he receive?

ORAL EXERCISES

1. How many inches in 1 ft. 4 in.? in 1 ft. 10 in.?
2. How many feet in 2 yd.? in 2 yd. 2 ft.?
3. How many pecks in 3 bu.? in 3 bu. 2 pk.?
4. How many minutes in 1 hr. 20 min.?
5. Give the number of quarts which equal 3 gal. 3 qt.
6. How many ounces in 3 lb. 4 oz.?
7. How many months in 2 yr. 2 mo.?
8. How many hours in 1 da. 4 hr.?
9. How many inches long is a square that measures 1 ft. 3 in. on a side?
10. Change 3 gal. 3 qt. to quarts.
11. Reduce 8 yd. to inches.

$$8 \text{ yd.} = 8 \times 3 \text{ ft.} = 24 \text{ ft.}$$
$$24 \text{ ft.} = 24 \times 12 \text{ in.} = 288 \text{ in.}$$

WRITTEN EXERCISES

Reduce:

1. 3 pk. 5 qt. to quarts.
2. 6 gal. to pints.
3. 14 bu. 3 pk. to pecks.
4. 9 yd. to inches.
5. 9 sq. yd. 2 sq. ft. to square feet.
6. 5 da. 10 hr. to hours.
7. 10 mi. 20 rd. to rods.
8. 4 lb. 5 oz. to ounces.
9. 11 bu. to quarts.
10. 2 cu. yd. 8 cu. ft. to cubic feet.
11. 3 tons 625 lb. to pounds.

ORAL EXERCISES

1. 20 inches = 1 foot and how many inches?

2. How many feet and how many inches in 19 in.? in 20 in.? in 22 in.?

3. 5 qt. + 6 qt. + 3 qt. = 1 peck and how many quarts?

4. Read the following as yards and feet: 10 ft.; 13 ft.; 16 ft.; 20 ft.

5. Read the following as quarts and pints: 9 pt.; 11 pt.; 15 pt.; 19 pt.

6. Read the following as bushels and pecks: 9 pk.; 10 pk.; 17 pk.; 25 pk.

WRITTEN EXERCISES

Reduce:

1. 235 in. to feet and inches.
2. 330 oz. to pounds and ounces.
3. 58 cu. ft. to cubic yards and cubic feet.
4. 345 ft. to yards.
5. 111 mo. to years and months.
6. 750 rods to miles and rods.
7. 625 hr. to days and hours.
8. 139 pt. to gallons, quarts, and pints.
9. 445 qt. to bushels, pecks, and quarts.
10. 108 in. to yards.
11. 267 in. to yards, feet, and inches.
12. 3873 sec. to hours, minutes, and seconds.
13. 117 da. to weeks and days.
14. 535 sq. in. to square feet and square inches.
15. 512 cubic feet to cords.

WRITTEN EXERCISES

1. Write the tables of measures you have learned.

2. How many feet in 72 in.? How many yards?

3. At 20 ct. a square yard, what will it cost to oil a floor 6 yd. long and 4 yd. wide?

4. Draw a plan of this floor on the scale of $\frac{1}{2}$ in. to 1 yd. Find the perimeter.

5. A car load of coal containing 30,000 lb. was sold at $6 a ton. How much was received?

6. How many cubic feet of stone in a wall 20 ft. long, 4 ft. high, and 2 ft. thick?

7. How many square inches in a rectangle 1 ft. 5 in. long and 1 ft. 1 in. wide?

8. Walter has 100 one-inch cubes. They are built in a solid 10 in. long and 2 in. wide. How high is the solid?

9. How many pint packages can a seedman make from 2 pk. 2 qt. of seeds?

10. At 60 ct. a cord, how many days will it take a man to earn $24 if he saws 2 cords of wood a day?

11. A bushel of corn weighs 56 pounds. What is the weight of a peck of corn?

12. A boy bought 4 dozen pencils at 35 ct. a dozen and sold them at 4 ct. apiece. What did he gain?

13. Change a five-dollar bill, using dollars, half dollars, and quarters.

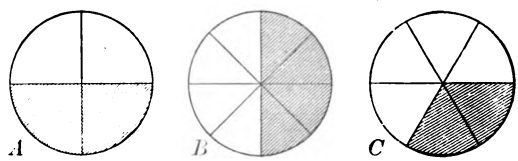
14. A man had in his pocket 1 five-dollar bill, 3 silver dollars, 2 half dollars, 3 quarters, 4 dimes, 3 nickels, and 4 pennies. How much money had he in all?

15. How many quart boxes will 3 pk. 2 qt. of berries fill?

FRACTIONS

ORAL EXERCISES

1. Into how many equal parts is the circle *A* divided? What do we call each part? How many fourths are shaded? How many halves?



2. Into how many equal parts is the circle *B* divided? How many eighths are shaded? How many fourths? How many halves?

3. Into how many equal parts is the circle *C* divided? How many sixths are shaded? How many thirds?

4. These equal parts of the circle are called fractions. A **fraction** is one or more equal parts of the unit.

5. In the circle *B* point to $\frac{4}{8}$; $\frac{3}{8}$; $\frac{2}{8}$. What part of the fraction tells the number of parts into which the circle has been divided? It is called the **denominator.**

6. What part of the fraction shows the number of parts that are taken? It is called the **numerator.**

7. *The denominator tells the number of equal parts in the unit; the numerator tells the number of parts taken.*

8. Read the denominators of the following fractions: $\frac{3}{4}$; $\frac{5}{7}$; $\frac{9}{11}$; $\frac{3}{8}$; $\frac{5}{6}$. Read the numerators.

9. A whole number is called an **integer;** as 5, 6, 9, 22, 3 hours, 7 pecks, 150.

10. A **mixed number** is an integer and a fraction; as $2\frac{1}{2}$, $4\frac{2}{5}$, $6\frac{5}{8}$ bushels, $3\frac{2}{7}$.

ORAL EXERCISES

1. In the fraction $\frac{5}{6}$ what is the denominator? What does it tell? What is the numerator? What does it tell?

2. Write three fractions; three integers; three mixed numbers.

3. The fractions $\frac{4}{4}$, $\frac{2}{2}$, $\frac{5}{5}$, $\frac{3}{3}$ are each equal to 1. The fractions $\frac{3}{4}$, $\frac{1}{2}$, $\frac{4}{5}$, $\frac{2}{3}$ are each less than 1. The fractions $\frac{5}{4}$, $\frac{7}{2}$, $\frac{8}{5}$, $\frac{5}{3}$ are each greater than 1.

4. A fraction that is less than 1 is called a **proper fraction.** A fraction that is equal to 1 or greater than 1 is called an **improper fraction.**

5. Read the following mixed numbers as improper fractions: $1\frac{1}{3}$; $2\frac{1}{2}$; $1\frac{3}{4}$; $2\frac{1}{5}$.

6. Read the following improper fractions as mixed numbers: $\frac{5}{2}$; $\frac{7}{2}$; $\frac{5}{3}$; $\frac{7}{6}$; $\frac{9}{8}$.

WRITTEN EXERCISES

Find the value of:

1. $27\frac{1}{8} + 13\frac{1}{4}$.
2. $25\frac{1}{2} + 16\frac{1}{4}$.
3. $32\frac{1}{4} + 26\frac{1}{8}$.
4. $62\frac{3}{4} + 14\frac{1}{8}$.
5. $35\frac{5}{8} + 27\frac{1}{4}$.
6. $\frac{1}{2} + \frac{1}{4}$.
7. $16\frac{2}{3} - 14\frac{1}{6}$.
8. $28\frac{1}{4} - 16\frac{1}{8}$.
9. $39\frac{4}{5} - 27\frac{1}{5}$.
10. $32\frac{3}{4} - 17\frac{1}{2}$.
11. $92\frac{5}{8} - 27\frac{1}{2}$.
12. $\frac{1}{3} + \frac{1}{6}$.
13. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$.
14. $35\frac{5}{6} - 22\frac{1}{3}$.
15. $21\frac{2}{3} + 25\frac{1}{6}$.

WRITTEN EXERCISES

1. How many halves in each of these mixed numbers? $3\frac{1}{2}$; $5\frac{1}{2}$; $7\frac{1}{2}$; $14\frac{1}{2}$; $9\frac{1}{2}$; $6\frac{1}{2}$.

2. How many thirds in each of these mixed numbers? $2\frac{2}{3}$; $5\frac{1}{3}$; $7\frac{1}{3}$; $4\frac{2}{3}$; $10\frac{1}{3}$; $8\frac{2}{3}$.

3. How many eighths in $\frac{1}{4}$? in $\frac{3}{4}$?
4. How many sixths in $\frac{1}{3}$? in $\frac{2}{3}$?
5. How many tenths in $\frac{1}{5}$? in $\frac{4}{5}$? in $\frac{1}{2}$?
6. How many twelfths in $\frac{1}{6}$? in $\frac{5}{6}$? in $\frac{1}{4}$? in $\frac{3}{4}$?

ORAL EXERCISES

1. How many thirds in 1? in 2? in 4? in $4\frac{1}{3}$?
2. Express as thirds: $1\frac{2}{3}$; 5; $6\frac{1}{3}$; 4; 7; $10\frac{1}{3}$.
3. Express as fourths: 1; $1\frac{1}{4}$; $1\frac{3}{4}$; $2\frac{1}{4}$; $3\frac{1}{4}$; $3\frac{3}{4}$; 4.
4. Express as sevenths: 1; $1\frac{2}{7}$; $1\frac{3}{7}$; $1\frac{5}{7}$; $2\frac{1}{7}$; $2\frac{3}{7}$.
5. Express as fifths: 1; $1\frac{3}{5}$; $5\frac{2}{5}$; $3\frac{1}{5}$; $4\frac{2}{5}$; $6\frac{4}{5}$.
6. Express as eighths: 1; $1\frac{3}{8}$; $2\frac{5}{8}$; $1\frac{7}{8}$; $5\frac{1}{8}$; $3\frac{5}{8}$.

WRITTEN EXERCISES

Reduce $\frac{3}{4}$ to sixteenths.

Both terms of a fraction may be multiplied by the same number without changing the value, thus:

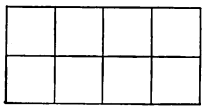
$$\frac{3}{4} = \frac{4 \times 3}{4 \times 4} = \frac{12}{16}.$$

Reduce $\frac{5}{8}$ to twenty-fourths. By what number must the denominator 8 be multiplied to make it 24?

$$\frac{5}{8} = \frac{3 \times 5}{3 \times 8} = \frac{15}{24}.$$

1. Reduce to sixteenths: $\frac{1}{2}$; $\frac{3}{4}$; $\frac{5}{8}$; $\frac{7}{8}$.
2. Reduce to twelfths: $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$.
3. Reduce to eighteenths: $\frac{1}{3}$; $\frac{1}{2}$; $\frac{2}{9}$; $\frac{3}{6}$.
4. Reduce to sixths: 5; $2\frac{1}{2}$; $3\frac{5}{6}$; $8\frac{1}{3}$.
5. Find the sum of $4\frac{1}{2} + 2\frac{1}{4} + 3 + 5\frac{1}{4}$.
6. Find the sum of $7\frac{1}{3} + 5\frac{1}{6} + 9\frac{1}{6} + 2$.

ORAL EXERCISES



1. $\frac{1}{2}$ is equal to how many fourths?
   $\frac{1}{4}$ is equal to how many eighths?
   $\frac{3}{4}$ is equal to how many eighths?
2. Express $\frac{1}{3}$ as sixths; as ninths; as twelfths.
3. Express $\frac{2}{3}$ as sixths; as ninths; as twelfths.
4. Both terms of a fraction may be divided by the same number without changing the value of the fraction, thus:

$$\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}.$$

5. A fraction is **in lowest terms** when both numerator and denominator cannot be divided by the same number.

Always divide by the largest number that will divide both numerator and denominator without remainder.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}, \text{ lowest terms.}$$

6. Reduce to lowest terms: $\frac{2}{4}$; $\frac{3}{6}$; $\frac{4}{8}$; $\frac{7}{14}$; $\frac{5}{10}$; $\frac{6}{12}$; $\frac{3}{12}$.
7. How many fractions that equal $\frac{1}{2}$ can you name in 1 minute?
8. How many fractions that equal $\frac{1}{3}$ can you name in 1 minute?
9. Reduce to lowest terms: $\frac{4}{16}$; $\frac{2}{8}$; $\frac{5}{20}$; $\frac{6}{24}$; $\frac{10}{50}$.

WRITTEN EXERCISES

1. Reduce to lowest terms: $\frac{14}{21}$; $\frac{40}{80}$; $\frac{9}{12}$; $\frac{20}{30}$; $\frac{8}{16}$; $\frac{8}{12}$; $\frac{6}{9}$; $\frac{15}{20}$; $\frac{16}{18}$; $\frac{18}{24}$; $\frac{30}{60}$.
2. Reduce $\frac{2}{3}$ to twelfths.
3. Reduce $\frac{4}{5}$ to fifteenths.
4. Reduce $\frac{3}{4}$ to sixteenths.
5. Reduce $\frac{2}{5}$ to tenths.

ORAL EXERCISES

1. Read as thirds: 2; $3\frac{2}{3}$; 4; $5\frac{1}{3}$; 7.
2. Read as fourths: 4; $4\frac{1}{4}$; $5\frac{3}{4}$; 6.
3. Read as fifths: 3; $3\frac{2}{5}$; $4\frac{1}{5}$; $5\frac{4}{5}$; 6.
4. Read as sixths: 2; $3\frac{1}{6}$; $1\frac{5}{6}$; $4\frac{1}{6}$; 5.
5. Read as eighths: 3; $2\frac{1}{8}$; $1\frac{3}{8}$; $4\frac{1}{8}$; 5.

WRITTEN EXERCISES

Reduce $15\frac{5}{9}$ to ninths.

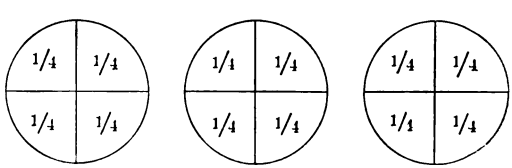
$$1 = \tfrac{9}{9}.$$
$$15 = 15 \times \tfrac{9}{9} = \tfrac{135}{9}.$$
$$15\tfrac{5}{9} = \tfrac{135}{9} + \tfrac{5}{9} = \tfrac{140}{9}.$$

1. Reduce $7\frac{1}{8}$ to eighths.
2. Reduce 9 to ninths.
3. Reduce $3\frac{2}{5}$ to fifths.
4. Reduce $8\frac{2}{3}$ to thirds.
5. Reduce $5\frac{5}{6}$ to sixths.
6. Reduce $9\frac{3}{4}$ to fourths.
7. Reduce $7\frac{3}{7}$ to sevenths.
8. Reduce $9\frac{5}{6}$ to sixths.
9. Reduce $7\frac{1}{9}$ to ninths.
10. Reduce $9\frac{3}{8}$ to eighths.

ORAL EXERCISES

1. How many whole circles can be made from these $\frac{12}{4}$ circles? from $\frac{8}{4}$ circles? from $\frac{4}{4}$ circles?

2. $\frac{5}{4} = 1$ and how many fourths? $\frac{7}{4} = 1$ and how many fourths? $\frac{9}{4} = 2$ and how many fourths?



3. How many dollars in $\$\frac{9}{2}$? in $\$1\frac{1}{2}$? in $\$1\frac{5}{2}$?

4. How many bushels in $\frac{3}{3}$ bu.? in $\frac{4}{3}$ bu.? in $\frac{6}{3}$ bu.?

5. How many yards in $\frac{10}{5}$ yd.? in $\frac{15}{5}$ yd.?

To reduce a fraction to a whole or a mixed number,

We divide the numerator by the denominator.

WRITTEN EXERCISES

Reduce to a whole or a mixed number:

1. $\frac{23}{5}$.
2. $\frac{41}{10}$.
3. $\frac{29}{7}$.
4. $\frac{24}{12}$.
5. $\frac{95}{3}$.
6. $\frac{42}{6}$.
7. $\frac{73}{5}$.
8. $\frac{129}{8}$.
9. $\frac{297}{9}$.
10. $\frac{28}{11}$.
11. $\frac{65}{4}$.
12. $\frac{150}{25}$.

ADDITION OF FRACTIONS

ORAL EXERCISES

Give the sums:

1. $3\frac{1}{2} + 2\frac{1}{2}$; $1\frac{3}{4} + 4\frac{1}{4}$; $2\frac{1}{3} + 3\frac{1}{3}$; $2\frac{1}{3} + 3$; $4\frac{2}{5} + 3\frac{2}{5}$.
2. $\frac{1}{4} + \frac{1}{2}$; $\frac{1}{4} + \frac{1}{8}$; $\frac{1}{6} + \frac{1}{2}$; $\frac{1}{2} + \frac{3}{8}$; $\frac{1}{2} + \frac{2}{6}$; $\frac{1}{3} + \frac{1}{6}$.

3. We have learned that before fractions can be added easily they must be changed so that the denominators shall be alike.

4. Find the sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.

In place of 2, 3, and 4 we want our denominators to be alike. What is the *smallest number* that will contain each of 2, 3, and 4 without a remainder? We call this number the **least common denominator**. $\frac{1}{2}$ is how many twelfths? $\frac{1}{3}$ is how many twelfths? $\frac{1}{4}$ is how many twelfths? The sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ is how many twelfths? $\frac{13}{12}$ is equal to 1 and how many twelfths?

5. Look at these fractions: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$. What is the least common denominator? Read each fraction, changing it to sixths. $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ = how many sixths? $\frac{6}{6}$ is what kind of a fraction? What is the best form in which to express $\frac{6}{6}$?

WRITTEN EXERCISES

Find the sum of $\frac{2}{3} + \frac{3}{4} + \frac{5}{12}$.

The least common denominator of 3, 4, and 12 is 12. We make 12 the denominator of the fractions.

$$\frac{2}{3} = \frac{4 \times 2}{12} = \frac{8}{12}$$

$$\frac{1}{4} = \frac{3 \times 3}{12} = \frac{9}{12}$$

$$\frac{5}{12} = \frac{1 \times 5}{12} = \frac{5}{12}$$

$$\text{The sum} = \frac{22}{12} = 1\frac{10}{12} = 1\frac{5}{6}$$

An improper fraction should be changed to *a whole or a mixed number*, and a fraction should be expressed in *lowest terms*.

Find the sum of:

1. $\frac{3}{4} + \frac{5}{8}$.
2. $\frac{5}{6} + \frac{2}{3}$.
3. $\frac{1}{3} + \frac{3}{4}$.
4. $\frac{2}{3} + \frac{1}{6} + \frac{1}{2}$.
5. $\frac{1}{6} + \frac{1}{2} + \frac{1}{3}$.
6. $\frac{1}{2} + \frac{1}{5} + \frac{1}{10}$.
7. $\frac{1}{4} + \frac{1}{2} + \frac{1}{8}$.
8. $\frac{2}{3} + \frac{1}{4} + \frac{1}{6}$.
9. $\frac{1}{2} + \frac{1}{6} + \frac{3}{4}$.
10. $\frac{2}{3} + \frac{1}{2} + \frac{1}{4}$.
11. $\frac{1}{2} + \frac{5}{6} + \frac{1}{3}$.
12. $\frac{1}{2} + \frac{3}{10} + \frac{2}{5}$.
13. $\frac{3}{4} + \frac{2}{3} + \frac{1}{6}$.
14. $\frac{5}{12} + \frac{1}{2} + \frac{5}{6}$.
15. $\frac{1}{4} + \frac{1}{2} + \frac{7}{8}$.
16. $\frac{3}{4} + \frac{5}{16} + \frac{1}{2}$.
17. $\frac{7}{12} + \frac{2}{3} + \frac{3}{4}$.
18. $\frac{1}{10} + \frac{4}{5} + \frac{1}{2}$.

19. Jane bought $\frac{2}{3}$ yd. of ribbon on Monday and $\frac{1}{6}$ yd. on Tuesday. How much ribbon did she buy in all?

20. Robert had $\$1\frac{1}{4}$ and his father gave him $\$3\frac{1}{2}$. How much money did he then have?

21. Find the weight of three packages. The first weighs $\frac{1}{4}$ lb., the second $\frac{3}{8}$ lb., and the third $\frac{1}{2}$ lb.

WRITTEN EXERCISES

Find the sum of $26\frac{1}{2} + 18\frac{5}{6}$.

$$26\tfrac{1}{2} = 26\tfrac{3}{6}$$
$$18\tfrac{5}{6} = 18\tfrac{5}{6}$$
$$44\tfrac{8}{6} = 45\tfrac{2}{6} = 45\tfrac{1}{3}.$$

Find the sum of:

1. $19\frac{4}{5} + 87\frac{1}{10}$.
2. $10\frac{2}{3} + 19\frac{3}{4}$.
3. $96\frac{3}{5} + 89\frac{7}{10}$.
4. $84\frac{5}{6} + 95\frac{3}{4}$.
5. $24\frac{7}{8} + 91\frac{1}{2}$.
6. $73\frac{2}{3} + 79\frac{5}{6}$.
7. $98\frac{1}{2} + 23\frac{5}{6}$.
8. $20\frac{5}{6} + 84\frac{1}{4}$.
9. $28\frac{1}{4} + 56\frac{1}{2}$.
10. $36\frac{1}{3} + 24\frac{1}{6}$.
11. $64\frac{3}{4} + 39\frac{1}{8}$.
12. $81\frac{5}{8} + 72\frac{3}{4}$.
13. $69\frac{1}{2} + 38\frac{3}{5}$.
14. $72\frac{1}{3} + 85\frac{3}{4}$.
15. $69\frac{5}{6} + 37\frac{1}{3}$.
16. $82\frac{3}{4} + 48\frac{5}{12}$.
17. $16\frac{2}{3} + 40\frac{3}{8}$.
18. $20\frac{5}{6} + 18\frac{3}{4}$.

19. The wind broke off $23\frac{3}{4}$ ft. from a flag staff. There remained $42\frac{2}{3}$ ft. How high was the flag staff?

20. Esther's mother bought $17\frac{2}{3}$ yd. of cloth for one dress and $12\frac{3}{4}$ yd. for another dress. How many yards did she buy for the two dresses?

SUBTRACTION OF FRACTIONS

ORAL EXERCISES

1. If I have $\frac{3}{5}$ of a pie and give away $\frac{1}{5}$ of the pie, what part of the pie have I left?

2. If John had $\$6\frac{3}{4}$ and spent $\$2\frac{1}{2}$, how much money had he left?

3. If Frank has $\$1\frac{1}{2}$, how much money must he earn to have $\$2\frac{3}{4}$?

4. Emily weighs $27\frac{1}{2}$ lb. now and has gained $1\frac{1}{4}$ lb. in a month. How much did she weigh a month ago?

WRITTEN EXERCISES

Subtract $\frac{3}{4}$ from $\frac{5}{6}$.

The least common denominator of the fractions is 12.

$$\frac{5}{6} = \frac{2 \times 5}{12} = \frac{10}{12}$$

$$\frac{3}{4} = \frac{3 \times 3}{12} = \frac{9}{12}$$

$$\text{The remainder} = \frac{1}{12}$$

Subtract:

1. $\frac{5}{6} - \frac{1}{4}$.
2. $\frac{2}{3} - \frac{1}{2}$.
3. $\frac{1}{3} - \frac{1}{4}$.
4. $\frac{1}{2} - \frac{1}{3}$.
5. $\frac{1}{2} - \frac{1}{5}$.
6. $\frac{1}{3} - \frac{1}{5}$.
7. $\frac{1}{4} - \frac{1}{6}$.
8. $\frac{4}{5} - \frac{2}{3}$.
9. $\frac{3}{5} - \frac{1}{2}$.
10. $\frac{7}{12} - \frac{1}{3}$.
11. $\frac{7}{8} - \frac{3}{4}$.
12. $\frac{2}{3} - \frac{1}{4}$.
13. $\frac{1}{16} - \frac{3}{8}$.
14. $\frac{7}{8} - \frac{1}{2}$.
15. $\frac{3}{4} - \frac{1}{3}$.

WRITTEN EXERCISES

Subtract $7\frac{1}{3}$ from $19\frac{1}{4}$.

$19\frac{1}{4} = 19\frac{3}{12} = 18\frac{15}{12}$

$7\frac{1}{3} = 7\frac{4}{12} = 7\frac{4}{12}$

$11\frac{11}{12}$

We cannot take $\frac{4}{12}$ from $\frac{3}{12}$, so we take 1 from the 19 and change it to $\frac{12}{12}$. Then $\frac{12}{12} + \frac{3}{12} = \frac{15}{12}$. The remainder is $11\frac{11}{12}$.

Find the remainders:

1. $29\frac{1}{2} - 14\frac{2}{3}$.
2. $92\frac{1}{5} - 37\frac{4}{5}$.
3. $66\frac{3}{4} - 24\frac{5}{6}$.
4. $93\frac{1}{8} - 21\frac{3}{8}$.
5. $79\frac{1}{6} - 44\frac{1}{2}$.
6. $36\frac{2}{3} - 18\frac{5}{6}$.
7. $53\frac{1}{9} - 35\frac{5}{9}$.
8. $106\frac{1}{5}$ lb. $- 88\frac{2}{3}$ lb.
9. $126\frac{1}{2}$ mi. $- 95\frac{7}{8}$ mi.
10. $175\frac{1}{4}$ gal. $- 98\frac{3}{4}$ gal.

11. A baker had 5 dozen biscuits and sold $3\frac{1}{2}$ dozen. How many dozen had he left?

12. From a piece of cloth $8\frac{2}{3}$ yd. long $4\frac{1}{2}$ yd. were sold. How many yards were left in the piece?

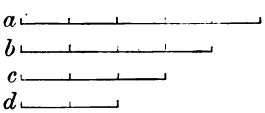
13. John's kite string measures $52\frac{1}{2}$ yd. He cut off $18\frac{3}{4}$ yd. How many yards long was his kite string then?

MULTIPLICATION OF FRACTIONS

ORAL EXERCISES

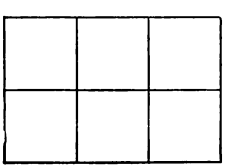
1. Call *a* 1, and name the values of the other lines.

What is $\frac{1}{2}$ of $\frac{2}{5}$? $\frac{1}{3}$ of $\frac{3}{5}$? $\frac{1}{2}$ of $\frac{4}{5}$? $\frac{3}{4}$ of $\frac{4}{5}$? $\frac{2}{3}$ of $\frac{3}{5}$?



2. Call *b* 1, and give the values of the other lines. What is $\frac{1}{3}$ of $\frac{3}{4}$? $\frac{1}{5}$ of $\frac{5}{4}$? $\frac{1}{2}$ of $\frac{1}{2}$?

3. Point to $\frac{1}{3}$ of the oblong. $\frac{1}{2}$ of $\frac{1}{3} = ?$ Point to $\frac{1}{2}$ of the oblong. $\frac{1}{3}$ of $\frac{1}{2} = ?$



4. Draw a line 12 inches long and divide it into inches. How many inches in $\frac{1}{4}$ of the line? Point to $\frac{1}{3}$ of this quarter. How many inches in $\frac{1}{3}$ of $\frac{1}{4}$ of the line? What part of the whole line is 1 inch? What then is the value of $\frac{1}{3}$ of $\frac{1}{4}$?

5. Look at the line and show that $\frac{2}{3}$ of $\frac{1}{4} = \frac{1}{6}$; $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4}$; $\frac{1}{3}$ of $\frac{3}{4} = \frac{1}{4}$; $\frac{5}{6}$ of $\frac{1}{2} = \frac{5}{12}$; $\frac{2}{3}$ of $\frac{1}{2} = \frac{1}{3}$.

6. Draw a line 8 inches long and divide it into eighths. Give the value of $\frac{1}{4}$ of $\frac{1}{2}$; $\frac{1}{3}$ of $\frac{3}{8}$; $\frac{1}{5}$ of $\frac{5}{8}$; $\frac{3}{4}$ of $\frac{1}{2}$.

7. Show that $\frac{1}{4}$ of $\frac{1}{2}$ is the same as $\frac{1}{2}$ of $\frac{1}{4}$.

WRITTEN EXERCISES

1. What is $\frac{1}{4}$ of 40 ct.? What is $\frac{1}{2}$ of $\frac{1}{4}$ of 40 ct.?
2. What is $\frac{1}{2}$ of 40 ct.? What is $\frac{1}{4}$ of $\frac{1}{2}$ of 40 ct.?
3. What is $\frac{1}{7}$ of 21 ct.? What is $\frac{2}{7}$ of 21 ct.?
4. $\frac{1}{9}$ of 45 bu. is how many bushels? $\frac{4}{9}$ of 45 bu. is how many bushels?
5. At 90 ct. a yard, what does $\frac{2}{3}$ yd. of cloth cost?
6. John had 48 marbles and lost $\frac{1}{4}$ of them. How many marbles did he lose?
7. At 80 ct. a peck, what will 2 quarts of cranberries cost?

ORAL EXERCISES

1. Copy these columns of numbers on the blackboard and write the sums:

8	9	7
8 8	9 9	7 7
8 8 8	9 9 9	7 7 7
8 8 8 8	9 9 9 9	7 7 7 7
8 8 8 8 8	9 9 9 9 9	7 7 7 7 7

Point to the columns representing the following numbers and tell the results:

2. 24; $\frac{2}{3}$ of 24; $\frac{4}{3}$ of 24; $\frac{5}{3}$ of 24.
3. 36; $\frac{3}{4}$ of 36; $\frac{1}{2}$ of 36; $\frac{5}{4}$ of 36.
4. 35; $\frac{1}{5}$ of 35; $\frac{3}{5}$ of 35; $\frac{4}{5}$ of 35.
5. 27; $\frac{1}{3}$ of 27; $\frac{2}{3}$ of 27; $\frac{4}{3}$ of 27.
6. 16; $\frac{1}{2}$ of 16; $1\frac{1}{2} \times 16$; 2×16; $2\frac{1}{2} \times 16$.
7. 21; $\frac{1}{3}$ of 21; $\frac{2}{3}$ of 21; $1\frac{1}{3} \times 21$.
8. 18; $\frac{1}{2}$ of 18; $1\frac{1}{2} \times 18$; 2×18; $2\frac{1}{2} \times 18$.

WRITTEN EXERCISES

Find $\frac{5}{6}$ of 240.

$\frac{1}{6}$ of $240 = 40$.

$\frac{5}{6}$ of $240 = 5 \times 40 = 200$.

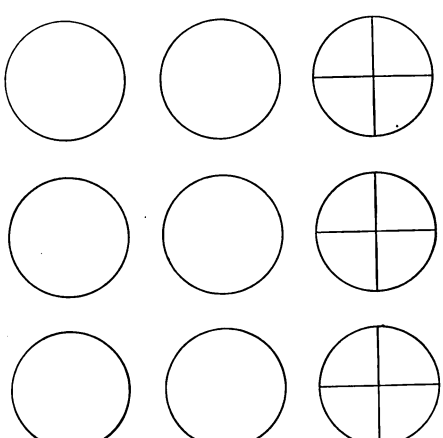
This is a short way of writing the work:

$$\frac{5}{\cancel{6}} \times \cancel{240}^{40} = 200.$$

1. Find $\frac{3}{7}$ of \$2.80.
2. Find $\frac{5}{9}$ of 450 bu.
3. Find $\frac{9}{10}$ of 870 yd.
4. Find $\frac{3}{8}$ of 648 ft.
5. Find $\frac{7}{12}$ of \$600.
6. Find $\frac{3}{4}$ of \$9.60.
7. Find $\frac{5}{6}$ of 366.
8. Find $\frac{2}{3}$ of 1242.
9. Find $\frac{5}{6}$ of 186.
10. Find $\frac{11}{12}$ of 144.
11. Find $\frac{5}{8}$ of 416.
12. Find $\frac{3}{4}$ of 288.

ORAL EXERCISES

1. 3×2 circles are how many circles? $3 \times \frac{3}{4}$ of a circle are how many circles? $\frac{9}{4}$ circles are how many circles? Then how many are $3 \times 2\frac{3}{4}$ circles?



2. How many dollars are $7 \times \$2\frac{1}{2}$?

3. If it takes $2\frac{1}{2}$ yd. of cloth for one apron, how many yards will it take for three aprons?

4. A man earns $\$2\frac{1}{4}$ a day. How much does he earn in 6 days?

WRITTEN EXERCISES

Find the product of $9 \times 12\frac{1}{4}$.

$$\begin{array}{r} 12\frac{1}{4} \\ 9 \\ \hline 108 \\ 2\frac{1}{4} \\ \hline 110\frac{1}{4} \end{array} \qquad \begin{array}{l} 9 \times 12 = 108 \\ 9 \times \frac{1}{4} = 2\frac{1}{4} \end{array}$$

Find the products:

1. $8 \times 5\frac{1}{3}$ pk.
2. $7 \times 14\frac{2}{5}$ yd.
3. $9 \times 27\frac{3}{4}$ in.
4. $8 \times 23\frac{1}{4}$ da.
5. $4 \times 22\frac{2}{3}$ wk.
6. $6 \times 44\frac{2}{5}$ mi.
7. $6 \times 13\frac{3}{8}$ lb.
8. $5 \times 21\frac{2}{3}$ bu.
9. $7 \times 33\frac{1}{5}$ gal.
10. $8 \times \$2\frac{1}{4}$.
11. $12 \times 20\frac{1}{4}$ bu.
12. $7 \times 6\frac{2}{3}$ yd.

13. Find the cost of 6 yd. of ribbon at $8\frac{1}{2}$ ct. a yard.
14. At 30 ct. a dozen, what will 18 oranges cost?
15. At $\$6\frac{1}{2}$ a week, how much does a boy earn in 3 weeks?
16. At 18 ct. a dozen, what will $2\frac{1}{2}$ dozen eggs cost?
17. When coal is \$9 per ton, what will $2\frac{2}{3}$ tons cost?
18. How many ounces in $2\frac{1}{2}$ pounds?
19. How many pecks in $8\frac{1}{4}$ bushels?

ALIQUOT PARTS OF A DOLLAR

ORAL EXERCISES

1. How many dimes in one dollar? How many quarters? How many half dollars? How many cents?
2. 10¢ equals what part of a dollar? 30¢? 70¢? 90¢? 50¢? 25¢? 75¢?

3. How many cents are $\frac{1}{3}$ of 100 cents? How many are $\frac{2}{3}$ of 100 cents?

4. $33\frac{1}{3}¢$ is what part of a dollar? $66\frac{2}{3}¢$ is what part?

5. How many cents is $\frac{1}{5}$ of \$1? $\frac{2}{5}$ of \$1?

Learn the following table:

$50¢ = \frac{1}{2}$ of \$1.	$75¢ = \frac{3}{4}$ of \$1.
$20¢ = \frac{1}{5}$ of \$1.	$33\frac{1}{3}¢ = \frac{1}{3}$ of \$1.
$25¢ = \frac{1}{4}$ of \$1.	$12\frac{1}{2}¢ = \frac{1}{8}$ of \$1.

6. At 25¢ apiece, how many books can be bought for \$1? for \$2? for \$3?

7. At 25¢ a yard, what will 4 yards of ribbon cost? 8 yards? 12 yards?

8. At 50¢ each, how many knives can I buy for \$1? for \$2? for \$3?

9. How many yards of cloth at $12\frac{1}{2}¢$ a yard can be bought for \$1? for \$3?

WRITTEN EXERCISES

How much will 16 dolls cost at 25¢ each?

Cost equals $16 \times \$\frac{1}{4} = \$\frac{16}{4} = \$4$.

Find the cost:

1. Of 160 books at 25¢.
2. Of 90 yards at $33\frac{1}{3}¢$.
3. Of 28 dozen eggs at 50¢.
4. Of 24 lb. at $12\frac{1}{2}¢$.
5. Of 30 bu. at 20¢.
6. Of 40 dozen at 25¢.
7. Of 20 tops at 10¢.
8. Of 25 qt. at 20¢.

9. At 25¢ each, how many baseball bats can be bought for \$2?

10. At 20¢ a dozen, what will 15 dozen pencils cost?

REVIEW EXERCISES

Give the sums at sight:

1.	2.	3.	4.	5.
$2\frac{1}{2}$	$7\frac{1}{4}$	$7\frac{1}{3}$	$7\frac{2}{3}$	$10\frac{3}{4}$
$5\frac{1}{2}$	$8\frac{3}{4}$	$8\frac{2}{3}$	$8\frac{2}{3}$	$5\frac{1}{2}$

6.	7.	8.	9.	10.
$8\frac{3}{8}$	$6\frac{2}{3}$	$5\frac{1}{6}$	$7\frac{1}{2}$	$8\frac{1}{6}$
$9\frac{1}{4}$	$8\frac{2}{3}$	$9\frac{1}{3}$	$5\frac{1}{4}$	$5\frac{1}{3}$

Give the differences at sight:

11.	12.	13.	14.	15.
$9\frac{3}{4}$	$10\frac{1}{2}$	$7\frac{1}{2}$	$12\frac{1}{3}$	$10\frac{1}{4}$
$4\frac{1}{2}$	$5\frac{1}{3}$	$3\frac{1}{3}$	$8\frac{1}{6}$	$4\frac{1}{8}$

16.	17.	18.	19.	20.
$17\frac{3}{4}$	$15\frac{1}{3}$	$9\frac{1}{4}$	$8\frac{1}{6}$	$12\frac{1}{3}$
$9\frac{1}{2}$	$8\frac{2}{3}$	$6\frac{1}{2}$	$5\frac{5}{6}$	$9\frac{1}{4}$

21. Read these mixed numbers as improper fractions: $5\frac{1}{3}$; $8\frac{2}{5}$; $7\frac{1}{4}$; $3\frac{1}{2}$; $9\frac{1}{3}$; $4\frac{3}{4}$; $6\frac{1}{5}$.

22. Read these improper fractions as whole or mixed numbers: $\frac{15}{2}$; $\frac{16}{3}$; $\frac{18}{2}$; $\frac{17}{2}$; $\frac{13}{4}$; $\frac{25}{8}$; $\frac{26}{5}$.

23. Find these products: $\frac{2}{3} \times 15$; $\frac{3}{4} \times 12$; $\frac{5}{6} \times 18$; $\frac{2}{5} \times 10$; $\frac{3}{8} \times 16$; $\frac{4}{5} \times 20$; $\frac{2}{7} \times 49$; $\frac{5}{8} \times 40$.

24. Read as fractions of \$1: 25¢; 50¢; 75¢; $33\frac{1}{3}$¢; $66\frac{2}{3}$¢; 20¢; $12\frac{1}{2}$¢; 10¢; 30¢; 70¢; 90¢.

25. Read as fractions of one foot: 6 in.; 4 in.; 8 in.; 3 in.; 9 in.; 2 in.; 10 in.

DECIMAL FRACTIONS

ORAL EXERCISES

1. How many cents are there in a dollar? What part of a dollar is 1 cent? 3 cents? 9 cents? 11 cents? 37 cents?

2. Write as dollars and cents $\$5\frac{32}{100}$; $\$4\frac{47}{100}$; $\$8\frac{3}{100}$.

3. Read the cents as hundredths of a dollar in these cases: \$5.26; \$9.72; \$6.65; \$2.49; \$2.50.

4. How many dimes are there in a dollar? What part of a dollar is 1 dime? 3 dimes? 7 dimes? 9 dimes?

5. \$0.45 is how many dimes and how many cents? Which figure tells the number of dimes? Which figure tells the number of cents?

6. Read the following, calling the dimes tenths and the cents hundredths: \$0.63; \$0.29; \$0.84; \$0.73; \$0.48; \$0.50; \$0.05.

7. The period that separates the dollars from the cents is called the **decimal point.** Dimes, or *tenths* of a dollar, are written in the first place at the right of the decimal point. Cents, or *hundredths* of a dollar, are written in the second place. We write 6 dimes and 4 cents thus: \$0.64.

8. $\frac{1}{10}$ of a foot may be written 0.1 ft. $\frac{1}{10}$ of a bushel may be written 0.1 bu. $\frac{3}{10}$ may be written 0.3.

9. Fractions written in this way are called **decimal fractions.** Fractions that are written with the numerator over the denominator are called **common fractions.**

10. Write as decimal fractions $\frac{3}{10}$ hr., $\frac{9}{10}$ bu., $\frac{7}{10}$ qt.

11. You have learned to write $\$\frac{5}{100}$ thus: \$0.05. $\frac{5}{100}$ of a foot may be written 0.05 ft.

12. Write as decimals $\frac{17}{100}$ in., $\frac{23}{100}$ yd., $\frac{6}{100}$ gal., $\frac{38}{100}$ pt.

13. Read the following decimal fractions: 0.4; 0.8; 0.23; 0.46; 0.09; 0.66; 0.7; 0.28; 0.15; 0.9; 0.70; 0.11; 0.05.

14. Write the following fractions first as common fractions, then as decimal fractions, thus: $\frac{4}{10} = 0.4$.

Four tenths; nine tenths; thirty-three hundredths; twenty-seven hundredths; forty-five hundredths.

15. Write $4\frac{12}{100}$, $8\frac{3}{10}$, $7\frac{13}{100}$, $9\frac{5}{10}$, $6\frac{72}{100}$ as decimals, thus: $4\frac{12}{100} = 4.12$.

16. We read 4.12 thus: four and twelve hundredths.

The word *and* is always read between the whole number and the decimal fraction.

ORAL EXERCISES

Read:

1. 3.76.	**4.** 5.03.	**7.** 0.3.	**10.** 0.75.
2. 2.79.	**5.** 14.16.	**8.** 0.47.	**11.** 3.83.
3. 0.62.	**6.** 10.4.	**9.** 2.06.	**12.** 0.08.

WRITTEN EXERCISES

Write these numbers in two ways:

Three and six tenths
Seven and twelve hundredths
One and twenty-three hundredths
Nine and nine hundredths
Twenty-eight hundredths
Five tenths
Six hundredths
Two and twenty-one hundredths

ORAL EXERCISES

1. If you divide anything into 10 equal parts, what is each part called? If you divide it into 100 equal parts, what is each part called? If you divide it into 1000 equal parts, each part is called *one thousandth.*

2. We may write one thousandth as a decimal in this way: 0.001. That is, $\frac{1}{1000} = 0.001$, and $\frac{2}{1000} = 0.002$.

3. Read the following decimal fractions: 0.001; 0.003; 0.014; 0.016; 0.024; 0.162; 0.224; 0.109.

4. Thousandths are written in the third place at the right of the decimal point.

5. Write as decimals these common fractions: $\frac{5}{1000}$; $\frac{23}{1000}$; $\frac{145}{1000}$; $\frac{227}{1000}$.

Read:

6. 0.375.	**9.** 8.006.	**12.** 0.4.	**15.** 216.05.
7. 0.582.	**10.** 0.027.	**13.** 0.04.	**16.** 18.058.
8. 6.045.	**11.** 18.06.	**14.** 0.004.	**17.** 19.197.

WRITTEN EXERCISES

Write in figures:

Seven tenths
Ninety-nine hundredths
Four and forty-four thousandths
Twenty-seven and twenty-seven thousandths
Fifty and fifteen thousandths
Six hundred eighty-three and five tenths
One hundred twenty and twelve thousandths
One hundred four and fourteen thousandths
Two hundred and two hundredths

WRITTEN EXERCISES

A decimal fraction may be changed to a common fraction in this way:

$$0.4 = \frac{4}{10} = \frac{4 \div 2}{10 \div 2} = \frac{2}{5}.$$

$$0.75 = \frac{75}{100} = \frac{75 \div 25}{100 \div 25} = \frac{3}{4}.$$

Reduce to common fractions in lowest terms:

1. 0.2.	**6.** 0.12.	**11.** 0.65.	**16.** 0.015.
2. 0.6.	**7.** 0.25.	**12.** 0.50.	**17.** 0.200.
3. 0.8.	**8.** 0.20.	**13.** 0.28.	**18.** 0.120.
4. 0.5.	**9.** 0.32.	**14.** 0.44.	**19.** 0.450.
5. 0.3.	**10.** 0.84.	**15.** 0.85.	**20.** 0.125.

ORAL EXERCISES

1. What is the sum of 2.1 ft. and 3.4 ft.?

2. Add 4.3, 3.2, 5.04.

In adding decimals we write the numbers so that the decimal points are in a column. All the tenths are then in the first column at the right of the decimal point, the hundredths in the second column, and the thousandths in the third column. Place the decimal point in the sum under the column of decimal points.

$$\begin{array}{r} 4.3 \\ 3.2 \\ 5.04 \\ \hline 12.54 \end{array}$$

Give the sums quickly:

3.	**4.**	**5.**	**6.**
1.02	5.02	1.03	4.5
2.3	4.07	2.3	10.04
0.08	2.2	5.05	1.25

7.	8.	9.	10.
7.104	5.423	3.12	5.123
2.125	6.53	4.056	4.06
3.016	2.007	8.103	2.1

11.	12.	13.	14.
8.065	6.552	7.25	9.5
10.52	8.7	10.038	10.05
7.07	9.603	2.104	7.025

WRITTEN EXERCISES

Find the sums:

1.	2.	3.
362.027	715.008	226.438
471.36	107.523	185.069
263.004	517.4	282.487
623.134	286.333	358.829
175.661	20.64	978.584

4.	5.	6.
86.589	86.487	169.113
297.08	27.005	85.94
365.231	301.837	130.475
172.808	141.375	827.5
314.856	88.066	105.372

7. $8.3 + 5.4 + 6.1$.
8. $3.25 + 4.2 + 0.012$.
9. $8.06 + 1.4 + 9.007$.
10. $26.3 + 9.004 + 1.23$.
11. $125.1 + 12.003 + 1.01$.
12. $42.007 + 1.23 + 4.125$.
13. $6.06 + 60.6 + 6.006$.
14. $9.2 + 13.14 + 1.722$.

WRITTEN EXERCISES

Subtract 5.876 from 12.494.

We write the numbers so that the decimal point in the subtrahend shall be under the decimal point in the minuend. We subtract as in whole numbers and place the decimal point in the remainder *directly under the decimal points* in the numbers.

$$\begin{array}{r} 12.494 \\ 5.876 \\ \hline 6.618 \end{array}$$

From 8.2 take 5.025.

We annex two zeros to the minuend so that the minuend may have as many decimal places as the subtrahend.

$$\begin{array}{r} 8.200 \\ 5.025 \\ \hline 3.175 \end{array}$$

Find the remainders:

1.	2.	3.	4.
32.662	407.906	24.802	31.912
28.971	286.897	18.951	27.837
5.	**6.**	**7.**	**8.**
36.17	45.87	87.523	96.04
19.382	26.718	66.98	7.384
9.	**10.**	**11.**	**12.**
42.35	586.2	68.29	864.3
8.205	394.23	55.004	789.43

13. 12.35 − 8.27.
14. 132.2 − 100.023.
15. 49.125 − 16.007.
16. 20.5 − 14.075.
17. 8.125 − 5.171.
18. 66.7 − 25.197.
19. 387.625 − 192.375.
20. 127.028 − 66.3.
21. 90.637 − 6.52.
22. 879.53 − 653.876.

BILLS AND RECEIPTS

WRITTEN EXERCISES

1. When a person buys goods he does not always pay for them at the time of the purchase. He has an account at the store and pays his *bills* at different times.

2. Mr. Robert Thomson bought at Mr. Charles Edmonds's store on Feb. 15, 10 lb. of coffee at 35¢ and 50 lb. of sugar at 5¢; on Feb. 19, 2 lb. of tea at 65¢ and 28 lb. of butter at 32¢. March 1 Mr. Thomson asked for his bill. The clerk, George Smith, then *filled* the bill by writing the cost of each item, and *footed* the bill by adding the cost of the different items to find the total cost. Mr. Thomson paid the *amount* of the bill, and the clerk *receipted* it by stamping it or by writing below the items *Paid* or *Received payment*, the date, the grocer's name, and his own name.

3. Then the bill looked like this:

BOSTON, March 1, 1907

Mr. Robert Thomson

Bought of CHARLES EDMONDS

1907					
Feb.	*15*	*10 lb. Coffee*	*@ 35¢*	*$3*	*50*
		50 lb. Sugar	*@ 5¢*	*2*	*50*
	19	*2 lb. Tea*	*@ 65¢*	*1*	*30*
		28 lb. Butter	*@ 32¢*	*8*	*96*
				$16	*26*

March 1, 1907 *Received Payment*

Charles Edmonds

By George Smith

4. Study the bill and answer these questions: What does @ mean? What was the amount of the bill? When were the goods bought? When was the bill paid? Who was the buyer? Who was the seller? Who was the clerk? Why should a buyer keep his receipted bills?

WRITTEN EXERCISES

Copy, fill, foot, and receipt each of the following bills. Date them at the place you live, and sign your name as the clerk who received the money.

1. *Mr. John Marshall*

Bought of ROBERT STUART

1907							
Mar.	*8*	*12 doz. Eggs*	*@ 26¢*				
		17 lb. Butter	*@ 32¢*				
	15	*34 lb. Cheese*	*@ 8¢*				
		16 bu. Potatoes	*@ 85¢*				

2. *Mr. William Anderson*

To KELLY & GARDNER, Dr.

1907							
Apr.	*6*	*3 yd. Silk*	*@ 80¢*				
		2 doz. Buttons	*@ 45¢*				
	15	*12 yd. Calico*	*@ 7¢*				
		5½ yd. Lace	*@ 40¢*				
May	*10*	*9½ yd. Linen*	*@ 60¢*				
		2 yd. Ribbon	*@ 75¢*				

Make out the following bills, using your name as buyer and the name of some dealer whom you know as seller; fill out properly, date, foot, and receipt each bill:

3. $1\frac{1}{2}$ lb. Candy at 10¢
1 qt. Peanuts at 15¢
2 doz. Oranges at 30¢
2 gal. Ice Cream at 90¢
3 boxes Strawberries at 15¢

4. 2 pair Rubbers at 50¢
2 pair Shoes at $3.75
1 pair Slippers at $2.00
4 pair Shoe Laces at 5¢
2 boxes Blacking at 10¢

5. $3\frac{1}{2}$ lb. Ham at 24¢
2 lb. Leaf Lard at 18¢
$4\frac{1}{2}$ lb. Roast Beef at 26¢
5 lb. Leg Mutton at 18¢
$3\frac{1}{2}$ lb. Sirloin Steak at 28¢
3 lb. Tenderloin at 26¢
7 lb. Pork at 22¢

6. 4 spools Thread at 5¢
3 bunches Tape at 3¢
10 yd. Cambric at $8\frac{1}{2}$¢
$7\frac{1}{2}$ yd. Canvas at 10¢
$5\frac{1}{2}$ yd. Flannel at $1.20
$2\frac{1}{4}$ doz. Buttons at 40¢
1 Skirt Braid at 12¢

7.	4 lb. Raisins	at $12\frac{1}{2}¢$
	$3\frac{1}{2}$ gal. Gasoline	at $32¢$
	$3\frac{1}{2}$ lb. Butter	at $32¢$
	2 lb. Coffee	at $28\frac{1}{2}¢$
	2 heads Lettuce	at $5¢$
	20 lb. Sugar	at $6\frac{1}{2}¢$

8.	2 Primary Geographies	at $65¢$
	3 Spellers	at $15¢$
	2 Readers	at $40¢$
	2 Arithmetics	at $35¢$
	2 Tablets	at $10¢$
	3 Copy Books	at $15¢$

GENERAL REVIEW

WRITTEN EXERCISES

1. In a certain school there are 310 pupils. $\frac{2}{5}$ of them are boys. How many boys are there in the school? How many girls?

2. If cotton is sold at 10 ct. a pound and a bale of cotton weighs 500 lb., what is the selling price of 1000 bales of cotton?

3. If it takes 4 strips of carpet, each $3\frac{1}{2}$ yards long, to carpet a room, how many yards of carpet are needed? What is the cost of the carpet at $95¢$ a yard?

4. How many feet of picture molding will be needed for a room 20 ft. long and 16 ft. wide? What will be the cost of the molding at $8¢$ a foot?

5. A man's wages are $3.20 a day. If he works 298 days in a year, how much does he earn?

6. A man pays $3\frac{1}{4}$ for a pair of shoes, $22\frac{1}{2}$ for a suit of clothes, and $2\frac{3}{4}$ for a hat. How much money does he pay for all?

7. At 25¢ a yard, what will 16 yards of cloth cost? At 50¢ a yard, what will 20 yards cost?

8. How many cubic feet of air are there in a schoolroom 20 feet long, 18 feet wide, and 12 feet high? How many cubic yards are there?

9. Find the perimeter and the area of a rectangle that is 21 inches long and $\frac{1}{3}$ as wide.

10. At 48 ct. a yard, what will $12\frac{3}{4}$ yd. of linen cost?

11. Martha has a book of 225 pages. She has read 189 pages. How many pages has she yet to read?

12. Walter has 3 dimes, 4 nickels, and 4 cents in his bank, and his sister has $\frac{1}{3}$ as much money in her bank. How many cents has his sister in her bank?

13. George has read to Chapter XX in his book. The last chapter is XXXV. How many chapters has he yet to read?

14. Jennie bought $1\frac{3}{4}$ lb. of beefsteak at 24 ct. a pound and paid for it with a half dollar. What change should she receive?

15. A milkman buys milk at 10¢ a gallon and sells it at 5¢ a quart. How much does he make on a gallon? How much on 2 gallons?

16. What is the cost of 9 dozen pencils at 3 dozen for a dollar?

17. Mr. Brown feeds his horse 12 quarts of oats each day. How many quarts of oats does he feed the horse in 1 week? How many pecks?

18. A third of my money is $22. How much money have I?

19. At a county fair 2250 twenty-five cent tickets were sold in a day. What were the gate receipts for that day?

20. How many bushels are there in 5 barrels of apples, each containing 11 pecks?

21. How many quarts of strawberries will a bushel crate hold?

22. Ellen's mother bought a turkey for Thanksgiving. It weighed $9\frac{3}{4}$ lb. What did it cost at 32 ct. a pound?

23. $\frac{9}{10}$ of the pupils in the A class were promoted. There were 30 pupils in the class. How many pupils were promoted?

24. A hen had 18 chickens. $\frac{2}{3}$ of them were yellow and the rest were black. How many were there of each color?

25. What will 2 gal. 1 qt. of sirup cost at 12 ct. a quart?

26. If a horse travels 5 miles an hour, how far will he travel in 12 days of 8 hours each?

27. If oranges are sold at the rate of 3 for a dime, how many oranges can be bought for 20 cents? for 30 cents?

28. From a tank containing $98\frac{1}{4}$ gallons of gasoline, $22\frac{1}{2}$ gallons were drawn off. How many gallons remained in the tank?

29. A man leaves his office at 5.30 P.M. and arrives at his home 35 minutes later. What is the time when he reaches his house?

30. How long will it take James to solve 10 problems at the rate of 2 problems in 5 minutes?

31. How far will a steamship go in 24 days if it travels 308 miles a day?

32. An agent sold 92 reapers at $165 each. How much did he receive for them?

33. At 10¢ an ounce, what will $\frac{1}{2}$ lb. of cinnamon cost?

34. A family uses 50 lb. of ice daily. How many days will 1000 lb. last?

35. The area of Chicago is 119,689 acres. How many square miles of land are there in Chicago?

36. How many half-pint bottles will 2 quarts of cider fill?

37. A boy sawed the wood in a pile 8 ft. long, 4 ft. wide, and 2 ft. high. What part of a cord did he saw?

38. A strawberry box is 6 inches long, 4 inches wide, and 4 inches deep. How many cubic inches does it contain?

39. To send a telegram from Chicago to San Francisco costs $0.75 for the first 10 words, and 5 cents for every word more. What would a message of 16 words cost?

40. A conductor on a street car collects 137 fares. How much money does he collect if each fare is 5 cents?

41. John walked $\frac{2}{3}$ of a mile to the store and $\frac{1}{6}$ of a mile farther to school. What part of a mile did he walk in all?

42. It is 85 miles from Chicago to Milwaukee. A man went from Milwaukee to Chicago and back again 3 times a week for 4 weeks. How many miles did he travel in taking these trips?

43. What number must be multiplied by 8 to give a product of 1712?

44. A messenger boy in a telegraph office received $18 a month as wages. During the year he spent $41 for clothing, $32 for car fare, and $25 for other things. He gave his mother the remainder. How much did his mother receive?

45. There are 213 teachers in a certain city. The number of pupils to each teacher averages 35. How many scholars are there in the city?

46. Grace wrote 10 words, which was $\frac{2}{3}$ of the lesson. How many words were in the lesson?

47. A farmer gets 1400 bushels of wheat from 40 acres. At this rate, how much does he get from an acre?

48. A man had a farm of 223.7 acres and sold 34.25 acres. How many acres had he left?

49. If a train runs 480 miles in 12 hours, how many miles does it run in 1 hour? in 30 minutes? in 15 minutes?

Supply the names of the buyer and the seller, the date, and the place of sale; fill, foot, and receipt:

50.	3 Dolls	@ 54¢
	2 Sets Toy Dishes	@ 67¢
	1 Doll's Bed	@ 24¢
	3 Doll's Chairs	@ 10¢
	6 Christmas Cards	@ 2¢
51.	12 Chairs	@ $2.50
	4 Tables	@ 8.25
	1 Writing Desk	@ 17.85
	4 Table Covers	@ 4.65
	8 Candle Sticks	@ 1.15
	1 Sofa	@ 27.95

ANSWERS

Page 144

2. $10.98.
3. $91.15.
4. $111.99.
5. $108.61.
6. $80.42.
7. $81.47.
8. $36.84.
9. $95.02.
10. $85.45.
11. $10.72.
12. $508.80.

Page 146

1. $51.09.
2. $18.03.
3. $74.98.
4. $24.64.
5. $35.11.
6. $41.16.
7. $52.65.
8. $10.82.
9. $67.28.
10. $24.87.
11. $11.09.
12. $27.86.
13. $81.75.
14. $48.45.
15. $25.63.
16. $39.06.
17. $2.55.
18. $26.47.
19. $12.51.
20. 1979.
21. 5687.
22. $1115.
23. $452.
24. 116.

Page 149

1. 230 yd.; 450 ft.; 680 gal.; 940 bu.; 270 hr.; 630 in.; $12,300; $232; $37,500; $436; $226.
2. $4.
3. $14.60.
4. 480.
5. 1680.
6. 950.
7. $5200.
8. $18.

Page 151

1. 528.
2. 736.
3. 966.
4. 1386.
5. 1032.
6. 1452.
7. 1190.
8. 575.
9. 3534.
10. 840.
11. 1575.
12. 2730.
13. 3965.
14. 3876.
15. 4592.
16. 1504.
17. 3074.
18. 1518.
19. 2926.
20. 1104.
21. 1872.
22. 972.
23. 2585.
24. 3081.

25. 868.
26. 1344.
27. 1408.
28. 6992.
29. 3640.
30. 4992.
31. 8556.
32. 69,184.
33. 20,544.
34. 45,450.
35. 40,180.
36. $342.72.
37. $560.66.
38. $724.12.
39. $470.58.
40. $625.68.
41. $92.04.
42. $98.55.
43. $355.11.
44. $130.87.
45. $422.40.

Page 152

1. $243.75.
2. 6156.
3. 6468.
4. $10,248.
5. $39.01.
6. $1200.
7. $89.60.
8. 6960.
9. $310.50.

Page 153

1. 24.
2. 21.
3. 210.
4. 120.
5. 23.
6. 35.
7. 38.
8. 27.
9. 29.
10. 123.
11. 42.
12. 63.
13. 26.
14. 41.
15. 74.

Page 154

1. $1686\frac{2}{5}$.
2. $1314\frac{1}{3}$.
3. $872\frac{2}{5}$.
4. $1831\frac{1}{4}$.
5. $1372\frac{2}{6}$.
6. $846\frac{1}{7}$.
7. 649.
8. $1886\frac{2}{5}$.
9. $621\frac{5}{7}$.
10. $1623\frac{1}{4}$.
11. $2807\frac{2}{3}$.
12. $1887\frac{3}{5}$.
13. $1710\frac{2}{4}$.
14. $966\frac{2}{5}$.
15. $1621\frac{2}{6}$.
16. $854\frac{5}{8}$.
17. $465\frac{8}{9}$.
18. $1173\frac{5}{7}$.
19. $710\frac{2}{3}$.
20. $469\frac{1}{10}$.
21. $524\frac{1}{8}$.
22. $683\frac{8}{9}$.
23. $459\frac{2}{7}$.
24. $514\frac{6}{8}$.
25. $616\frac{7}{10}$.
26. 748.
27. $523\frac{5}{8}$.
28. $891\frac{1}{6}$.
29. $1096\frac{7}{8}$.
30. $444\frac{4}{10}$.
31. $1468\frac{1}{4}$.
32. $873\frac{1}{8}$.
33. $1318\frac{1}{7}$.

Page 156

1. 22.
2. 45.
3. 64.
4. 48.
5. 33.
6. 16.
7. 25.
8. 82.
9. 44.
10. 66.
11. 53.
12. 65.

Page 157

1. 25.
2. 23.
3. 16.
4. 24.
5. 19.
6. 37.
7. 111.
8. 48.
9. 99.
10. 51.
11. 21.
12. 51.

Page 157

1. 202.
2. 202.
3. 204.
4. 105.
5. 206.
6. 304.
7. 108.
8. 202.
9. 109.

Page 159

1. 87.
2. 43.
3. 87.
4. 29.
5. 114.
6. 112.
7. 372.
8. 365.
9. 82.
10. 93.
11. 84.
12. 38.
13. 76.
14. 42.
15. 69.
16. 45.
17. $118\frac{27}{57}$.
18. $105\frac{17}{89}$.
19. $117\frac{38}{73}$.
20. $113\frac{30}{79}$.
21. $138\frac{5}{53}$.
22. $141\frac{8}{61}$.
23. $222\frac{9}{31}$.
24. $171\frac{21}{23}$.
25. 85.
26. 28.
27. $203\frac{33}{39}$.
28. 65.
29. 44.
30. $51\frac{12}{84}$.
31. $140\frac{28}{48}$.
32. $172\frac{5}{29}$.
33. $164\frac{34}{36}$.
34. $155\frac{8}{37}$.
35. $201\frac{4}{49}$.
36. $141\frac{37}{52}$.
37. $149\frac{36}{63}$.
38. $88\frac{66}{74}$.
39. $109\frac{26}{89}$.
40. $170\frac{9}{21}$.
41. $218\frac{24}{34}$.
42. $109\frac{11}{42}$.
43. $126\frac{14}{47}$.
44. $128\frac{52}{65}$.
45. $130\frac{47}{67}$.
46. $101\frac{21}{91}$.
47. $126\frac{14}{22}$.
48. $129\frac{23}{29}$.

Page 159

1. 42 miles.
2. 45.
3. $32.
4. 65.
5. 32.
6. $63.
7. 54.
8. 60.
9. 360.
10. 32.
11. $45.
12. 98.
13. 125.
14. 36 ft.
15. 32; $3.20.
16. 40.
17. 28.

Page 162

1. $42\frac{2}{3}$.
2. 71.
3. $140\frac{1}{3}$.
4. 114.
5. 68.
6. 82.
7. $37\frac{1}{3}$.
8. $73\frac{1}{3}$.
9. 52.
10. 38.
11. 48.
12. $59\frac{1}{2}$.
13. 127.
14. 67.
15. $43\frac{1}{3}$.
16. $53\frac{2}{3}$.
17. $74\frac{1}{3}$.
18. $189\frac{1}{3}$.
19. $170\frac{2}{3}$.
20. $238\frac{1}{2}$.
21. $131\frac{1}{2}$.
22. 292.
23. 254.
24. $328\frac{1}{3}$.
25. $304\frac{1}{2}$.
26. $316\frac{1}{3}$.
27. $293\frac{1}{3}$.
28. $303\frac{1}{3}$.

Page 164

1. $116\frac{1}{2}$.
2. 92.
3. $218\frac{1}{2}$.
4. 111.
5. $199\frac{1}{3}$.
6. $77\frac{1}{3}$.
7. $122\frac{2}{3}$.
8. $35\frac{1}{3}$.
9. $21\frac{1}{2}$.
10. $30\frac{1}{2}$.
11. $61\frac{1}{2}$.
12. $111\frac{1}{2}$.
13. $62\frac{2}{3}$.
14. $150\frac{2}{3}$.
15. $451\frac{2}{3}$.
16. $123\frac{2}{3}$.
17. $159\frac{1}{3}$.
18. $378\frac{1}{3}$.
19. 694.
20. 353.
21. $348\frac{1}{2}$.
22. $494\frac{1}{3}$.
23. $89\frac{1}{2}$.
24. 421.
25. $585\frac{1}{3}$.
26. 477.
27. $794\frac{1}{3}$.
28. $493\frac{1}{3}$.
29. $121\frac{1}{2}$.
30. $342\frac{1}{2}$.
31. $495\frac{2}{3}$.
32. 473.
33. $332\frac{1}{3}$; 677; $786\frac{1}{3}$; 1744; 492; $273\frac{1}{3}$; $250\frac{2}{3}$; 170; $190\frac{1}{2}$; $353\frac{1}{2}$; $226\frac{1}{2}$; $480\frac{1}{2}$; $315\frac{1}{3}$; $441\frac{1}{3}$; $1304\frac{1}{3}$; $454\frac{1}{3}$; 458; $1074\frac{1}{3}$; $1270\frac{2}{3}$; 1184; $1302\frac{1}{2}$; 783; $1769\frac{1}{2}$; 1104; 874; 1316; 1083; 784; $368\frac{1}{2}$; $595\frac{1}{2}$; $780\frac{1}{3}$; 1320.

Page 165

1. $1\frac{2}{4}$.
2. $6\frac{2}{4}$ yd.
3. 2 gal.
4. 4 bu.
5. $70\frac{3}{4}$.
6. 49.
7. $55\frac{3}{4}$.
8. $76\frac{2}{4}$.
9. 41.
10. 78.
11. 91.
12. 295.
13. $301\frac{2}{4}$.
14. 288.
15. 515.
16. 595.
17. 782.
18. 1507.
19. 609.
20. 1095.
21. 691.
22. 772.
23. 1097.
24. 1099.
25. 524.
26. 666.
27. 593.
28. 504.
29. 520.

Page 166

1. $6\frac{3}{4}$.
2. $62\frac{2}{4}$.
3. 47.
4. $52\frac{3}{4}$.
5. $64\frac{2}{4}$.
6. $18\frac{1}{4}$.
7. $27\frac{2}{4}$.
8. 34.
9. $42\frac{3}{4}$.
10. $65\frac{2}{4}$.
11. $19\frac{3}{4}$.
12. $301\frac{3}{4}$.
13. $188\frac{2}{4}$.
14. 256.
15. $502\frac{3}{4}$.
16. $490\frac{1}{4}$.
17. $226\frac{2}{4}$.
18. $266\frac{3}{4}$.
19. $397\frac{2}{4}$.
20. 329.
21. $473\frac{3}{4}$.
22. $89\frac{2}{4}$.
23. 104.
24. $79\frac{3}{4}$.
25. 109.
26. $181\frac{2}{4}$.
27. $51\frac{3}{4}$.
28. $193\frac{3}{4}$.
29. $220\frac{3}{4}$.
30. $350\frac{3}{4}$.
31. 359.
32. $125\frac{3}{4}$.
33. $9\frac{2}{4}$.
34. $33\frac{3}{4}$.
35. 670.
36. $315\frac{3}{4}$.

37. $31\frac{1}{4}$; 111; $139\frac{2}{4}$; $99\frac{1}{4}$; 113; $72\frac{1}{4}$; 82; $92\frac{2}{4}$; $127\frac{1}{4}$; 122; $131\frac{3}{4}$; $544\frac{1}{4}$; 605; $500\frac{2}{4}$; $745\frac{1}{4}$; $1293\frac{3}{4}$; 571; $611\frac{1}{4}$; 880; $1315\frac{2}{4}$; $916\frac{1}{4}$; 284; $308\frac{2}{4}$; $291\frac{3}{4}$; $322\frac{2}{4}$; 616; $244\frac{1}{4}$; $344\frac{1}{4}$; $511\frac{1}{4}$; $553\frac{1}{4}$; $777\frac{2}{4}$; $450\frac{1}{4}$; 202; $384\frac{1}{4}$; $1054\frac{2}{4}$; $1109\frac{1}{4}$.

Page 168

1. 72; 144.
2. 112; 224.
3. 62; 186.
4. 145; 580.
5. 21; 147.
6. 71; 355.
7. 31; 93.
8. 13.
9. 27.

Page 171

1. 11; 13.
2. 22; 19; 25.
3. 11.
4. 135.
5. 30; 51.
6. 12.
7. 35 ct.
8. 8 ct.
9. 18; 2
10. 90 ct.

Page 173

1. 36.
2. 64.
3. 42.
4. 108.
5. 200.
6. 60.
7. 144.
8. 180.
9. 240.

Page 175

2. 67 yr.
3. 8.
5. 4 wk. 3 da; 4 wk. 2 da; 4 wk. 3 da; 4 wk. 2 da.
6. 17.
7. 9 hr.
8. 35.

Page 176

16. $34.65.
17. 336,665.
18. 771,824.
19. 10,870.
20. 7264.
21. 320.
22. 66,604.
23. $640.
24. 34,778.
25. 75 ct.
26. 60,006.
27. $29,080.
28. 55.
29. 983.
30. 84 ct.
31. $36.99.
32. 24,014.
33. 15,021.
34. $365.
35. $20.60.
36. 782.
37. $8550.
38. 732.
39. $540.
40. 25,567.
41. 396.
42. 132,250.
43. $117.50.
44. 537.
45. 9053.
46. $17.50.
47. 17.
48. $24.
49. 228,744.
50. 73,008.
51. 883.
52. $805\frac{3}{4}\frac{3}{8}$.
53. $75.
54. $49.
55. $123.

56. 291,555.
57. 762,107.
58. $122.37.
59. 38,615.
60. $522.50.
61. 2003.
62. 7896 mi.
63. 14 mo.
64. $2987.75.
65. 378.
66. 203,796.
67. 49,778.
68. 215 mi.
69. $250.
70. $2000.
71. 163.
72. 53,120.
73. 468,786.
74. 1058.
75. $740\frac{40}{56}$.
76. $377.72.
77. $152.25.
78. 6.
79. $420.
80. 180.

Page 184

1. 190,325 square miles.
2. 13,720.
3. 10,382 lb.
4. $346.03.
5. $600.
6. $895.43.
7. $361.20.
8. $1353.30.
9. $489.26.
10. $1597.51.
11. $990.05.

Page 185

1. 36 yd. 1 ft.
2. 34 wk. 1 da.
3. 29 gal. 1 qt.
4. 41 ft. 9 in.
5. 40 yd. 1 ft.
6. 84 ft. 3 in.

Page 186

1. 41 bu. 1 pk.
2. 67 bu.
3. 111 bu. 2 pk.
4. 195 bu. 2 pk.
5. 197 bu. 2 pk.
6. 209 bu. 2 pk.

Page 186

1. 19 hr. 23 min.
2. 20 hr. 10 min.
3. 21 hr. 10 min.
4. 21 hr. 32 min.
5. 30 hr. 41 min.
6. 60 hr. 4 min.

Page 187

1. 8 yr. 5 mo. 9 da.
2. 16 yr. 4 mo. 9 da.
3. 49 yr. 6 mo. 6 da.
4. 45 yr. 1 mo. 2 da.
5. 12 lb. 2 oz.
6. 16 lb. 5 oz.
7. 31 lb. 6 oz.
8. 29 lb. 5 oz.
9. 58 lb. 9 oz.
10. 25 lb. 1 oz.

Page 188

1. $253.75.
2. $750.34.
3. $825.55.
4. $711.08.
5. $301.24.
6. $98.57.
7. $106.22.
8. $200.18.
9. $477.06.
10. $512.08.
11. $373.52.
12. $354.78.
13. $728.89.
14. $277.69.
15. $684.18.
16. $200.05.
17. 7859 ft.
18. 625.
19. 14,346.
20. $759.88.

Page 189

1. 6 yd. 1 ft.
2. 7 wk. 2 da.
3. 8 ft. 2 in.

Page 190

1. 11 gal. 2 qt.
2. 13 wk. 6 da.
3. 37 yd. 1 ft.
4. 8 bu. 3 pk.
5. 16 lb. 14 oz.
6. 18 yr. 8 mo.
7. 5 hr. 39 min.
8. 3 hr. 41 min.
9. 3 hr. 50 min.
10. 6 yr. 2 mo. 28 da.
11. 9 yr. 3 mo. 25 da.
12. 3 yr. 1 mo. 22 da.
13. 2 yr. 0 mo. 27 da.

Page 191

1. $3648.
2. $8512.
3. $20,440.
4. $8556.
5. $18,112.
6. $26,508.
7. $14,763.
8. $20,444.
9. $27,553.
10. $69,184.
11. $34,272.
12. $56,066.
13. $72,412.
14. $47,058.
15. $50,594.
16. $38,766.
17. $9072.
18. $12,064.
19. $16,875.
20. $11,284.
21. $21,216.
22. $17,875.
23. $30,432.
24. $22,101.
25. $33,600.
26. $11,368
27. $19,992.
28. $28,490.
29. $19,136.
30. $26,487.

Page 191

1. 15,875.
2. 101,152.
3. 30,728.
4. 31,584.
5. 75,274.
6. 110,360.
7. 31,866.
8. 46,125.
9. 252,144.
10. 120,805.
11. 29,016.
12. 68,475.
13. 40,300.
14. 260,374.
15. 192,792.

Page 192

1. 148,555.
2. 208,575.
3. 232,379.
4. 234,901.
5. 463,120.
6. 1,601,613.
7. 5,952,816.
8. 4,212,032.
9. 3,948,000.
10. 3,678,480.
11. 870,672.
12. 1,024,650.
13. 5,017,388.
14. 1,896,000.
15. 6,839,280.

Page 193

1. 6.
2. $60\frac{5}{6}\frac{7}{0}$.
3. $60\frac{1}{6}\frac{5}{0}$.
4. 7.
5. $7\frac{6}{7}\frac{8}{0}\frac{8}{0}$.
6. $7\frac{4}{7}\frac{6}{0}\frac{8}{0}$.
7. 9.
8. $9\frac{7}{4}\frac{5}{0}\frac{5}{0}$.
9. $9\frac{2}{4}\frac{0}{0}\frac{7}{0}\frac{5}{0}$.

Page 193

1. $164\frac{3}{3}\frac{4}{6}$.
2. $155\frac{8}{3}\frac{}{7}$.
3. $201\frac{4}{4}\frac{}{9}$.
4. $141\frac{3}{5}\frac{7}{2}$.
5. $149\frac{3}{6}\frac{6}{3}$.
6. $88\frac{6}{7}\frac{6}{4}$.
7. $109\frac{2}{5}\frac{6}{9}$.
8. $170\frac{9}{2}\frac{}{1}$.
9. $218\frac{2}{3}\frac{4}{4}$.
10. $109\frac{1}{4}\frac{1}{2}$.
11. $126\frac{1}{4}\frac{4}{7}$.
12. $128\frac{5}{6}\frac{2}{5}$.
13. $130\frac{4}{6}\frac{7}{7}$.
14. $101\frac{2}{9}\frac{1}{1}$.
15. $126\frac{1}{2}\frac{4}{5}$.
16. $129\frac{2}{2}\frac{3}{5}$.
17. $118\frac{2}{5}\frac{7}{7}$.
18. $105\frac{1}{8}\frac{7}{9}$.
19. $117\frac{3}{7}\frac{8}{3}$.
20. $113\frac{2}{7}\frac{0}{5}$.
21. $138\frac{5}{5}\frac{}{3}$.
22. $141\frac{8}{6}\frac{}{1}$.
23. $222\frac{9}{3}\frac{}{1}$.
24. $171\frac{2}{2}\frac{1}{3}$.
25. $117\frac{2}{7}\frac{5}{1}$.
26. $106\frac{3}{9}\frac{0}{3}$.
27. $165\frac{1}{4}\frac{7}{3}$.
28. $154\frac{5}{1}\frac{}{9}$.
29. $317\frac{2}{2}\frac{0}{9}$.
30. $159\frac{3}{5}\frac{3}{5}$.

Page 194

1. $42.
2. 78.
3. $60.
4. 22.
5. 40 mo.

Page 194

1. 135.
2. 223.
3. 124.
4. 123.
5. $606\frac{3}{1}\frac{2}{0}\frac{}{1}$.
6. $428\frac{9}{2}\frac{5}{0}\frac{}{1}$.
7. $127\frac{2}{3}\frac{5}{0}\frac{8}{2}$.
8. $278\frac{5}{2}\frac{4}{1}\frac{}{5}$.
9. 312.
10. $206\frac{1}{2}\frac{3}{4}\frac{}{5}$.
11. 320.
12. $594\frac{3}{4}\frac{7}{3}\frac{}{6}$.
13. 604.
14. 370.
15. 407.

Page 196

1. 2 rd.; 33 ft.
2. 2640 ft.; 1320 ft.; 660 ft.
3. 640 rd.; 160 rd.
4. 36 in.; 90 in.
5. 60 ft.; 20 yd.
6. 1760 yd.
7. 120 rd.
8. 3840 rd.; 21,120 yd.; 63,360 ft.

Page 197

1. 3168 sq. in.
2. 480 sq. rd.
3. 800 sq. rd.; 5 A.
4. 1520 sq. rd.
5. 6400 A.

Page 198

1. 504 cu. ft.
2. 48 cu. yd.
3. 8640 cu. ft.; 320 cu. yd.
4. 128 cu. ft.
5. 42 cu. ft.
6. 120 cu. ft.
7. 1000 cu. in.

Page 200

1. 128 rd.; 6 A.
2. $1600.
3. $1.
4. 12 mi.; 30 mi.
5. $5\frac{1}{3}$ yd.
6. 3 wk.
7. $6400.
8. 128 qt.
9. 124 qt.; 31 gal.
10. 80 ct.
11. 40 ct.
12. $5.60.

Page 201

1. 29 qt.
2. 48 pt.
3. 59 pk.
4. 324 in.
5. 83 sq. ft.
6. 130 hr.
7. 3220 rd.
8. 69 oz.
9. 352 qt.
10. 62 cu. ft.
11. 6625 lb.

Page 202

1. 19 ft. 7 in.
2. 20 lb. 10 oz.
3. 2 cu. yd. 4 cu. ft.
4. 115 yd.
5. 9 yr. 3 mo.
6. 2 mi. 110 rd.
7. 26 da. 1 hr.
8. 17 gal. 1 qt. 1 pt.
9. 13 bu. 3 pk. 5 qt.
10. 3 yd.
11. 7 yd. 1 ft. 3 in.
12. 1 hr. 4 min. 33 sec.
13. 16 wk. 5 da.
14. 3 sq. ft. 103 sq. in.
15. 4 cords.

Page 203

2. 6 ft; 2 yd.
3. $4.80.
4. 20 yd.
5. $90.
6. 160 cu. ft.
7. 221 sq. in.
8. 5 in.
9. 36.
10. 20.
11. 14 lb.
12. 52 ct.
14. $10.34.
15. 26

Page 205

1. $40\frac{3}{8}$.
2. $41\frac{3}{4}$.
3. $58\frac{3}{8}$.
4. $76\frac{7}{8}$.
5. $62\frac{7}{8}$.
6. $\frac{3}{4}$.
7. $2\frac{3}{8}$.
8. $12\frac{1}{8}$.
9. $12\frac{3}{5}$.
10. $15\frac{1}{4}$.
11. $65\frac{1}{8}$.
12. $\frac{3}{6}$.
13. $\frac{7}{8}$.
14. $13\frac{3}{8}$.
15. $46\frac{5}{6}$.

Page 205

1. $\frac{7}{2}$; $\frac{11}{2}$; $\frac{15}{2}$; $\frac{29}{2}$; $\frac{19}{2}$; $\frac{13}{2}$.
2. $\frac{8}{3}$; $\frac{16}{3}$; $\frac{22}{3}$; $\frac{14}{3}$; $\frac{31}{3}$; $\frac{26}{3}$.
3. $\frac{2}{8}$; $\frac{6}{8}$.
4. $\frac{2}{6}$; $\frac{4}{6}$.
5. $\frac{2}{10}$; $\frac{8}{10}$; $\frac{5}{10}$.
6. $\frac{2}{12}$; $\frac{10}{12}$; $\frac{3}{12}$; $\frac{9}{12}$.

Page 206

1. $\frac{8}{16}$; $\frac{12}{16}$; $\frac{10}{16}$; $\frac{14}{16}$.
2. $\frac{6}{12}$; $\frac{8}{12}$; $\frac{9}{12}$; $\frac{10}{12}$.
3. $\frac{6}{18}$; $\frac{9}{18}$; $\frac{4}{18}$; $\frac{9}{18}$.
4. $\frac{30}{6}$; $\frac{15}{6}$; $\frac{23}{6}$; $\frac{50}{6}$.
5. 15.
6. $23\frac{4}{6}$.

Page 207

1. $\frac{2}{3}$; $\frac{1}{2}$; $\frac{3}{4}$; $\frac{2}{3}$; $\frac{1}{2}$; $\frac{2}{3}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{8}{9}$; $\frac{3}{4}$; $\frac{1}{2}$.
2. $\frac{8}{12}$.
3. $\frac{12}{15}$.
4. $\frac{12}{16}$.
5. $\frac{4}{10}$.

Page 208

1. $\frac{57}{8}$.
2. $\frac{81}{9}$.
3. $\frac{17}{5}$.
4. $\frac{26}{3}$.
5. $\frac{35}{6}$.
6. $\frac{39}{4}$.
7. $\frac{52}{7}$.
8. $\frac{59}{6}$.
9. $\frac{64}{9}$.
10. $\frac{75}{8}$.

Page 209

1. $4\frac{3}{5}$.
2. $4\frac{1}{10}$.
3. $4\frac{1}{7}$.
4. 2.
5. $31\frac{2}{3}$.
6. 7.
7. $14\frac{3}{5}$.
8. $16\frac{1}{8}$.
9. 33.
10. $2\frac{6}{11}$.
11. $16\frac{1}{4}$.
12. 6.

Page 210

1. $1\frac{3}{8}$.
2. $1\frac{1}{2}$.
3. $1\frac{1}{12}$.
4. $1\frac{1}{3}$.
5. 1.
6. $\frac{4}{5}$.
7. $\frac{7}{8}$.
8. $1\frac{1}{12}$.
9. $1\frac{5}{12}$.
10. $1\frac{5}{12}$.
11. $1\frac{2}{3}$.
12. $1\frac{1}{5}$.
13. $1\frac{7}{12}$.
14. $1\frac{3}{4}$.
15. $1\frac{5}{8}$.
16. $1\frac{9}{16}$.
17. 2.
18. $1\frac{2}{5}$.
19. $\frac{5}{6}$ yd.
20. $\$4\frac{3}{4}$.
21. $1\frac{1}{8}$ lb.

Page 211

1. $106\frac{9}{10}$.
2. $30\frac{5}{12}$.
3. $186\frac{3}{10}$.
4. $180\frac{7}{12}$.
5. $116\frac{3}{8}$.
6. $153\frac{1}{2}$.
7. $122\frac{1}{3}$.
8. $105\frac{1}{12}$.
9. $84\frac{3}{4}$.
10. $60\frac{1}{2}$.
11. $103\frac{7}{8}$.
12. $154\frac{3}{8}$.
13. $108\frac{1}{10}$.
14. $158\frac{1}{12}$.
15. $107\frac{1}{6}$.
16. $131\frac{1}{6}$.
17. $57\frac{1}{24}$.
18. $39\frac{7}{12}$.
19. $66\frac{5}{12}$ ft.
20. $30\frac{5}{12}$.

Page 212

1. $\frac{7}{12}$.
2. $\frac{1}{6}$.
3. $\frac{1}{12}$.
4. $\frac{1}{6}$.
5. $\frac{3}{10}$.
6. $\frac{2}{15}$.
7. $\frac{1}{12}$.
8. $\frac{2}{15}$.
9. $\frac{1}{10}$.
10. $\frac{1}{4}$.
11. $\frac{1}{8}$.
12. $\frac{5}{12}$.
13. $\frac{5}{16}$.
14. $\frac{3}{8}$.
15. $\frac{5}{12}$.

Page 212

1. $14\frac{5}{6}$.
2. $54\frac{2}{5}$.
3. $41\frac{1}{12}$.
4. $71\frac{3}{4}$.
5. $34\frac{2}{3}$.
6. $17\frac{5}{6}$.
7. $17\frac{5}{8}$.
8. $17\frac{8}{15}$ lb.
9. $30\frac{5}{8}$ mi.
10. $76\frac{1}{2}$ gal.
11. $1\frac{1}{2}$.
12. $4\frac{1}{6}$.
13. $33\frac{3}{4}$.

Page 214

1. 10 ct.; 5 ct.
2. 20 ct.; 5 ct.
3. 3 ct.; 6 ct.
4. 5 bu.; 20 bu.
5. 60 ct.
6. 12.
7. 20 ct.

Page 215

1. $1.20.
2. 250 bu.
3. 783 yd.
4. 243 ft.
5. $350.
6. $7.20.
7. 305.
8. 828.
9. 155.
10. 132.
11. 260.
12. 216.

Page 216

1. $42\frac{2}{3}$ pk.
2. $100\frac{4}{5}$ yd.
3. $249\frac{3}{4}$ in.
4. 186 da.
5. $90\frac{2}{3}$ wk.
6. $266\frac{2}{5}$ mi.
7. $80\frac{1}{4}$ lb.
8. $108\frac{1}{3}$ bu.
9. $232\frac{2}{5}$ gal.
10. $18.
11. 243 bu.
12. $46\frac{2}{3}$ yd.
13. 51 ct.
14. 45 ct.
15. $19\frac{1}{2}$.
16. 45 ct.
17. $24.
18. 40 oz.
19. 33 pk.

Page 217

1. $40.
2. $30.
3. $14.
4. $3.
5. $6.
6. $10.
7. $2.
8. $5.
9. 8.
10. $3.

Page 222

1. $\frac{1}{5}$.
2. $\frac{3}{5}$.
3. $\frac{4}{5}$.
4. $\frac{1}{2}$.
5. $\frac{3}{10}$.
6. $\frac{3}{25}$.
7. $\frac{1}{4}$.
8. $\frac{1}{5}$.
9. $\frac{8}{25}$.
10. $\frac{21}{25}$.
11. $\frac{13}{20}$.
12. $\frac{1}{2}$.
13. $\frac{7}{25}$.
14. $\frac{11}{25}$.
15. $\frac{17}{20}$.
16. $\frac{3}{200}$.
17. $\frac{1}{5}$.
18. $\frac{3}{25}$.
19. $\frac{9}{20}$.
20. $\frac{1}{8}$.

Page 223

1. 1895.186.
2. 1646.904.
3. 2031.407.
4. 1236.564.
5. 644.77.
6. 1318.4.
7. 19.8.
8. 7.462.
9. 18.467.
10. 36.534.
11. 138.113.
12. 47.362.
13. 72.666.
14. 24.062.

Page 224

1. 3.691.
2. 120.009.
3. 5.851.
4. 4.075.
5. 16.788.
6. 19.152.
7. 20.543.
8. 88.656.
9. 34.145.
10. 191.97.
11. 13.286.
12. 74.87.
13. 4.08.
14. 32.177.
15. 33.118.
16. 6.425.
17. 2.954.
18. 41.503.
19. 195.25.
20. 60.728.
21. 84.117.
22. 225.654.

Page 226

1. $24.88.
2. $13.54.
3. $3.15.
4. $10.90.
5. $6.57.
6. $9.51.
7. $4.71.
8. $3.90.

Page 228

1. 124; 186.
2. $50,000.
3. 14; $13.30.
4. 72; $5.76.
5. $953.60.
6. $28.50.
7. $4; $10.
8. 4320; 160.
9. 56 in.; 147 sq. in.
10. $6.12.
11. 36.
12. 18 ct.
13. 16.
14. 8 ct.
15. 10 ct.; 20 ct.
16. $3.
17. 84; $10\frac{1}{2}$.
18. $66.
19. $562.50.
20. $13\frac{3}{4}$.
21. 32.
22. $3.12.
23. 27.
24. 12 yellow; 6 black.
25. $1.08.
26. 480 mi.
27. 6; 9.
28. $75\frac{3}{4}$.
29. 6.05 P.M.
30. 25 min.
31. 7392 mi.
32. $15,180.
33. 80 ct.
34. 20.
35. $187\frac{9}{5}\frac{9}{4}\frac{9}{0}$.
36. 8.
37. $\frac{1}{2}$.
38. 96.
39. $1.05.
40. $6.85.
41. $\frac{5}{6}$.
42. 2040.
43. 214.
44. $118.
45. 7455.
46. 15.
47. 35 bu.
48. 189.45.
49. 40; 20; 10.
50. $3.62.
51. $136.60.